Analyse – diagnostic des transformations des systèmes agraires en Thaïlande

Diagnostic-analysis of transformations in Thai agrarian systems





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- **Objectives & concept of Agrarian System (AS)**
- **The Development-Oriented Research on Agrarian Systems (DORAS) approach : a system & comprehensive diagnostic-analysis**

- **Phases & outputs of the diagnostic-analysis of an agroecosystem**
  - Agro-ecological *zonation*
  - Analysis of recent agricultural *transformations*
  - Analysis of the *functioning of* diverse agricultural *production systems*
  - Construction of a farmer *typology* & *relationships* among farm types
  - Evolution *trajectories* of agricultural production systems & *intervention points*

- **Illustrations : case studies in contrasted Thai agrarian systems**
  - **Southern coast : Sathing Phra District, Songkhla Province (1982-83 & 1987-88)**
  - **Central plain : Kamphaengsaen District, Nakhon Pathom Province (1989-91)**
  - **Western uplands : Saiyok District, Kanjanaburi Province (1992-93)**
  - **Lower Northeast plateau : southern Ubon Ratchathani (1994-95 & 2005-08)**
  - **Upper Northeast plateau : Ban Hin Lad, Kut Chieng Mee, Nong Saeng, Khon Kaen Province (2002-2003)**
  - **Northern highlands : Mae Fah Luang District, Chiang Rai Province (1994-95 & 2002-05), Tha Wang Pha District, Nan Province (2006-08)**

OBJECTIVES OF PRELIMINARY DIAGNOSTIC-ANALYSIS ON AGRARIAN SYSTEMS

- **To identify and prioritize factors & conditions determining the choice and the evolution of diverse farmers' production systems at the regional agrarian system scale**

- **To understand how they practically interfere in the local agricultural transformations : current driving forces at work, main trends, farming systems trajectories & key problems, etc.**

- **To identify intervention points to promote agricultural development : key themes / topics tailored to the specific needs of different types of household-based production systems, suitable inflexions in agricultural policies, etc.**

Concept of Agrarian System (AS) : a definition

- "An **historically** constituted **mode of exploitation of the environment,** durably **adapted to the bioclimatic conditions** of a given area and coherent with **the social conditions and needs** at that moment"

  (Mazoyer, 1985; Mazoyer & Roudart, 1997)

- Emphasis is on:

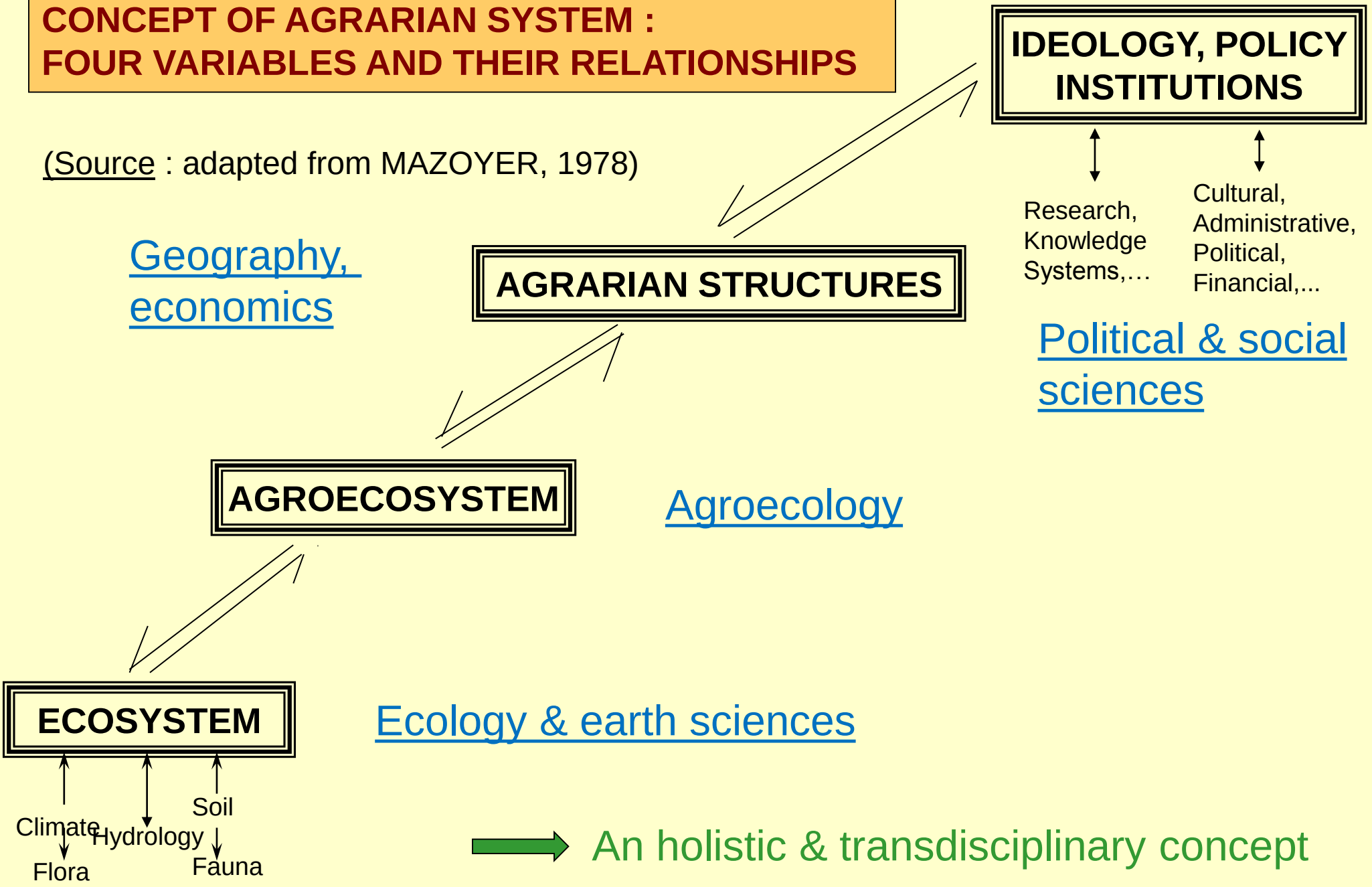
  - The mode of artificialization of the ecosystem → delimitation of the system boundary

  - The historical evolution → the long term is taken into account

  - Focus on interactions between agro-ecological & social dynamics → A trans-disciplinary concept

CONCEPT OF AGRARIAN SYSTEM : FOUR VARIABLES AND THEIR RELATIONSHIPS

(Source : adapted from MAZOYER, 1978)



THE CONCEPT OF AGRARIAN SYSTEM : THE FOUR VARIABLES AND THEIR RELATIONSHIPS

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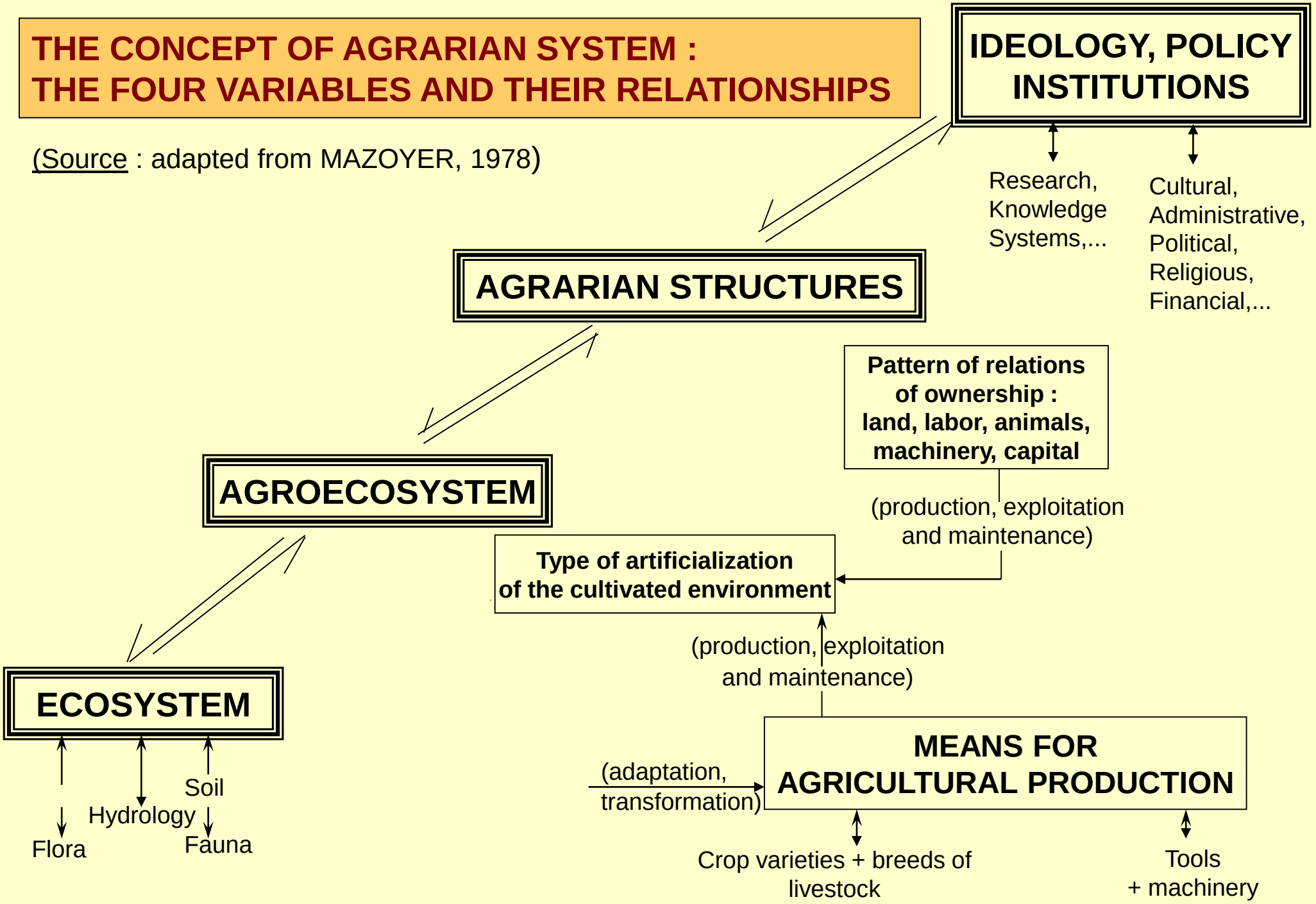

THE CONCEPT OF AGRARIAN SYSTEM : THE FOUR VARIABLES AND THEIR RELATIONSHIPS

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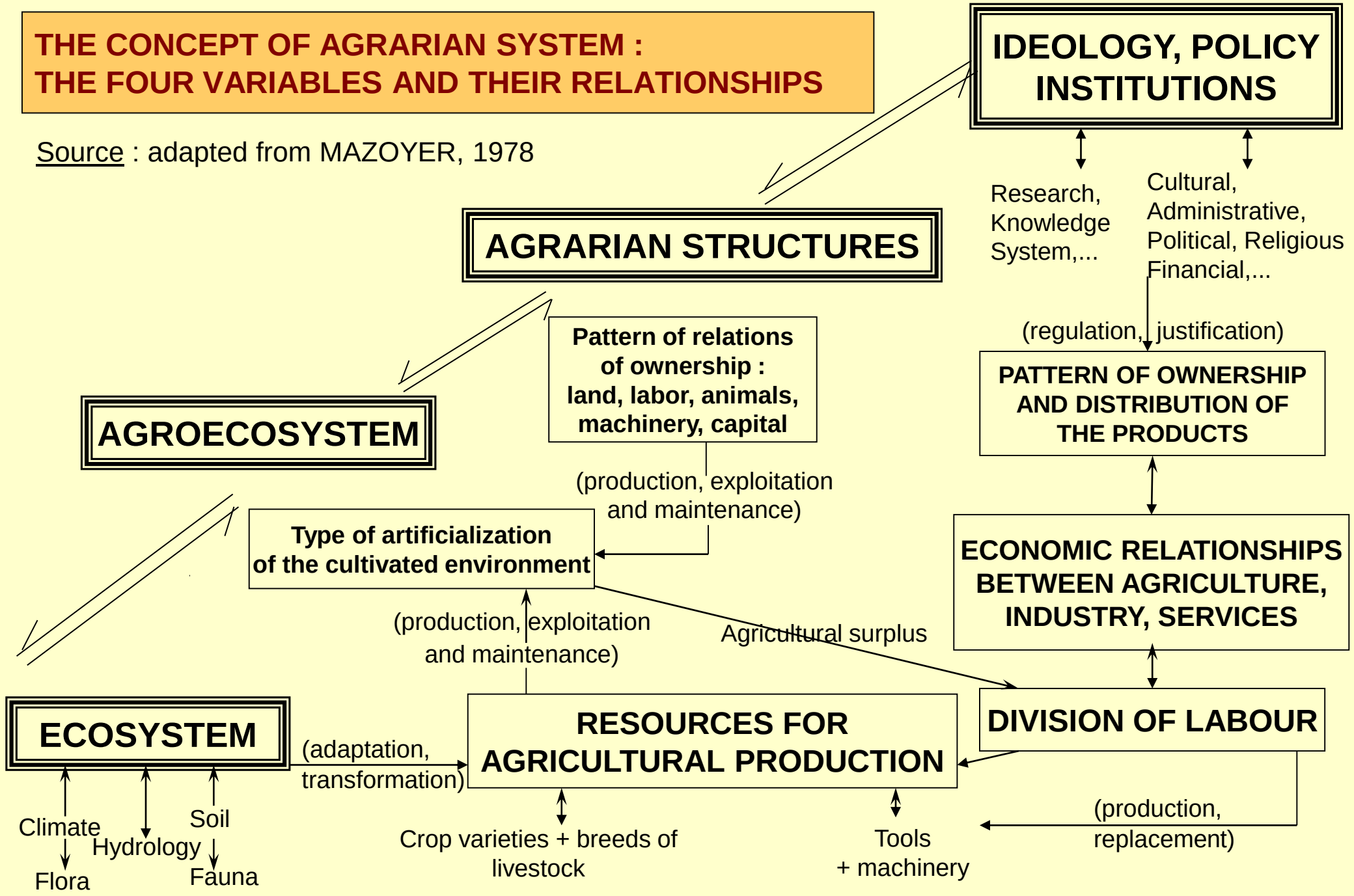


THE DIAGNOSTIC-ANALYSIS: ITS MAIN TOOLS

ECOLOGY/ TECHNICAL PRACTICES / SOCIAL RELATIONS / ECONOMIC DYNAMICS

PRELIMINARY DIAGNOSIS PHASE

Agro-ecological Zonation

Analysis of Recent Agricultural Transformations

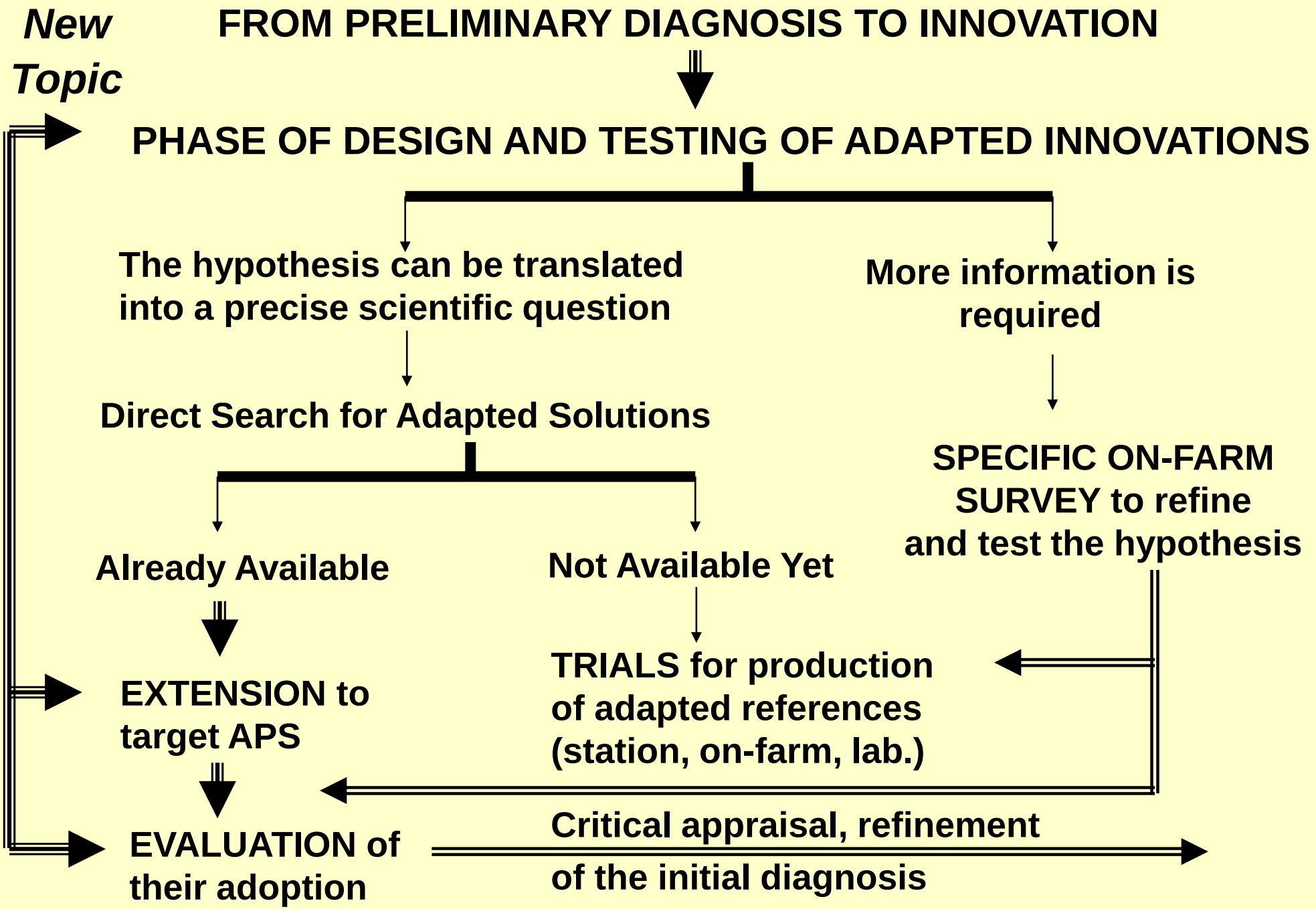
APS functioning & Farmer Typology

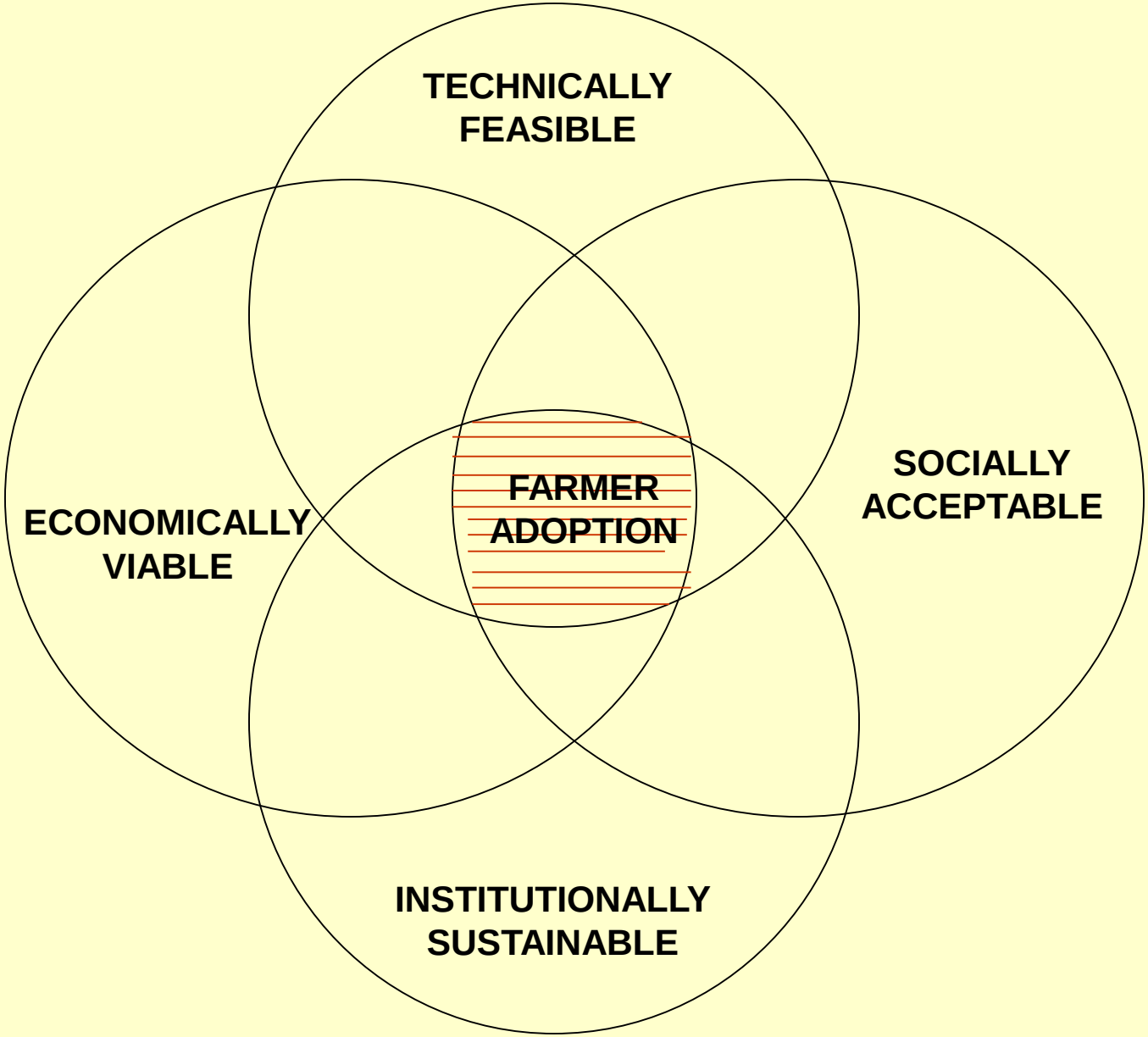
Labour Productivity Analysis

Hypotheses on the Sustainability of the Different Type of Agricultural Production Systems (APS)

Hypotheses on a Hierarchy of Constrains / Potentialities per Main Agro-ecological Zone & Type of APS

Hypotheses of Key Bio-Physical, Social & Economic Limiting Factors of Production Processes Per Main Agro-ecological Zone & per Type of Farmer

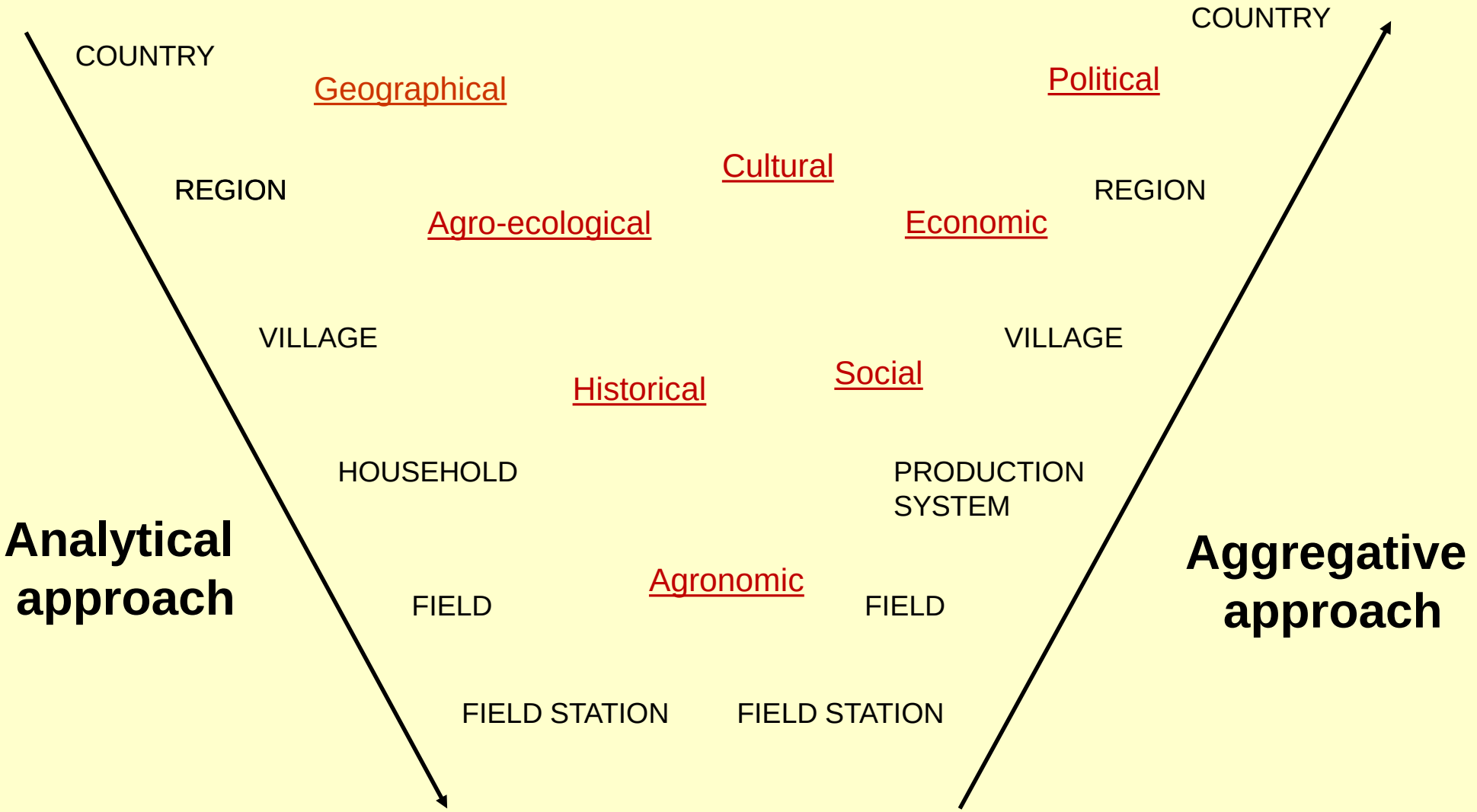

New Topic
FROM PRELIMINARY DIAGNOSIS TO INNOVATION
PHASE OF DESIGN AND TESTING OF ADAPTED INNOVATIONS
The hypothesis can be translated into a precise scientific question
More information is required
Direct Search for Adapted Solutions
SPECIFIC ON-FARM SURVEY to refine and test the hypothesis
Already Available
Not Available Yet
EXTENSION to target APS
TRIALS for production of adapted references (station, on-farm, lab.)
EVALUATION of their adoption
Critical appraisal, refinement of the initial diagnosis



CHARACTERISTICS OF ADAPTED INNOVATIONS

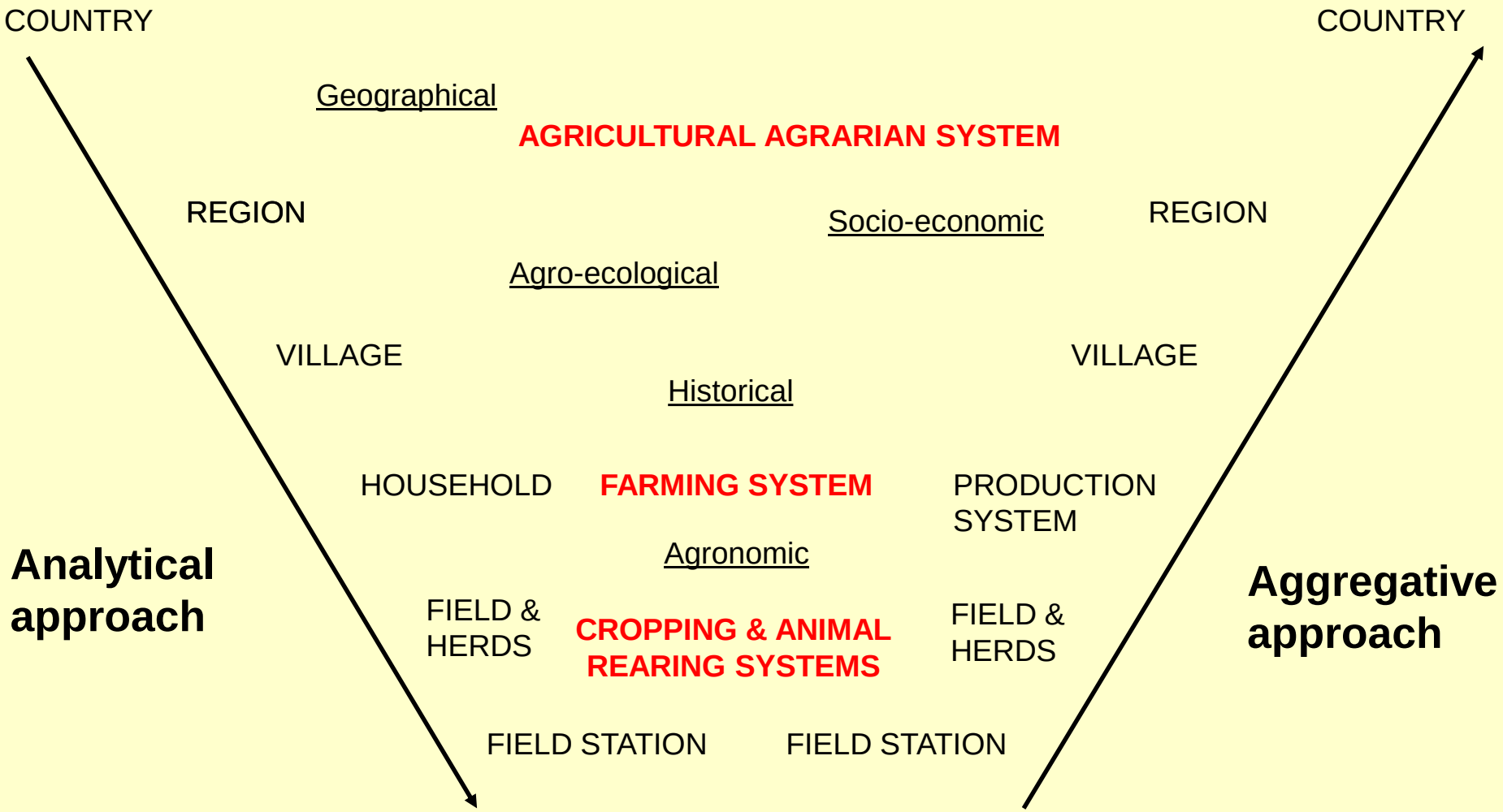
AN TRANSDISCIPLINARY & MULTI-SCALE INVESTIGATION PROCESS

Dominant Approaches & Domains in the Diagnosis



DEVELOPMENT-ORIENTED RESEARCH IN AGRICULTURE PROCESS

Key concepts, Approaches & Domains in the Diagnosis



Several diagnostic-analyses on regional agrarian systems implemented in Thailand during 1981-2008

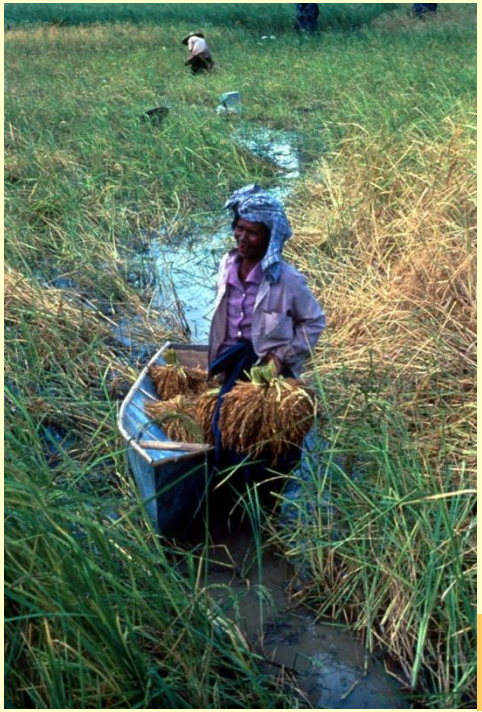
- Southern coastal area / rainfed (1981-1987)

- Central delta & lower terrace / irrigated (1989-1991)

- Western lowlands & uplands / irrigated + rainfed (1992-1993)

- Lower & upper Northeast plateau / rainfed (1994-95 & 2005-08)

- Upper Northern highlands / rainfed (1994-985 & 2002-08)



Sathing Phra, Songkhla province, South (Eastern)

Western Central Plain, Nakhon Pathom & Kanjanaburi Provinces

Drought-prone Rainfed Lowland Rice system

Ubon Ratchathani province, Lower Northeast Thailand

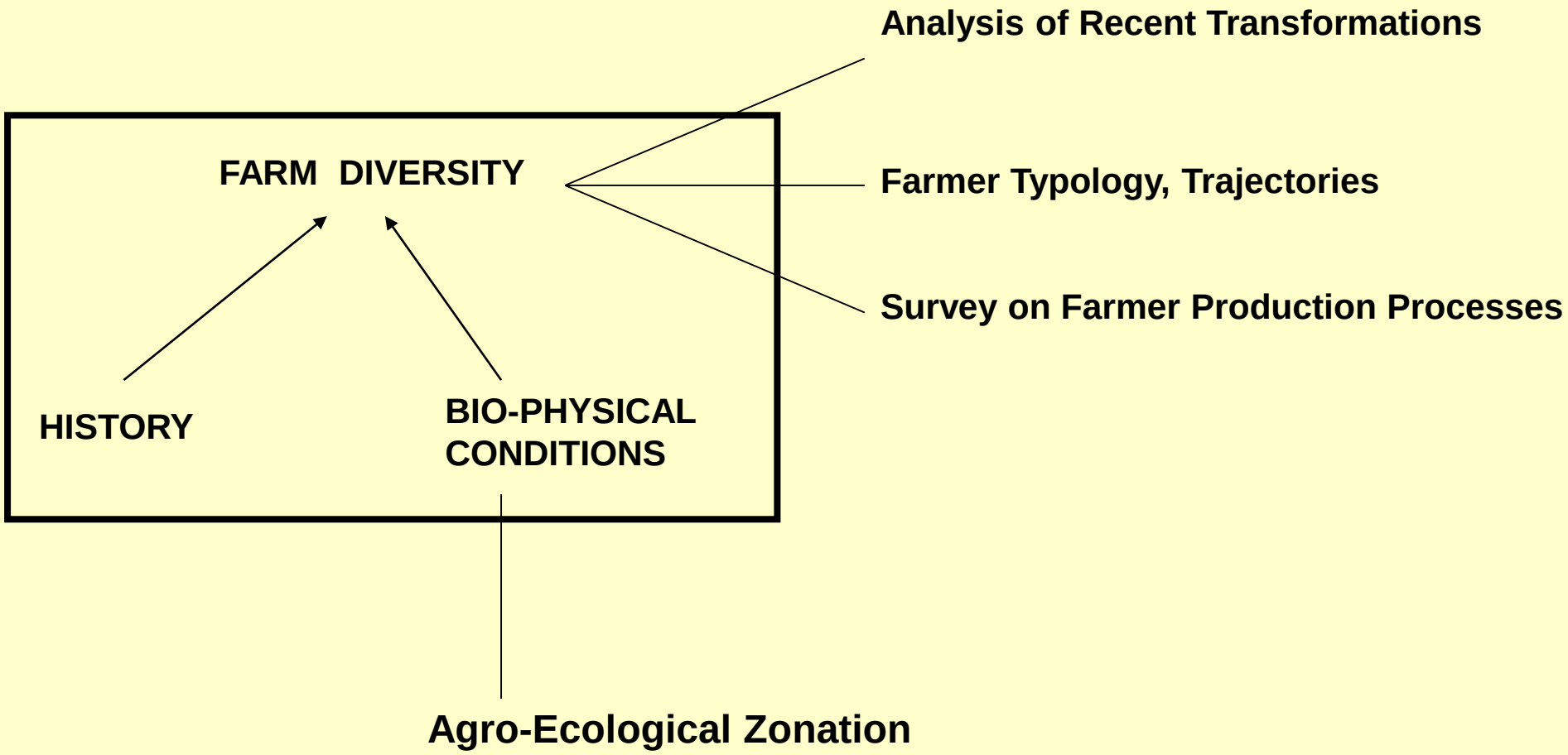
Drought-prone Rainfed Lowland Rice & industrial cash crops system

Ban Pong district, Khon Kaen Province, Upper Northeast

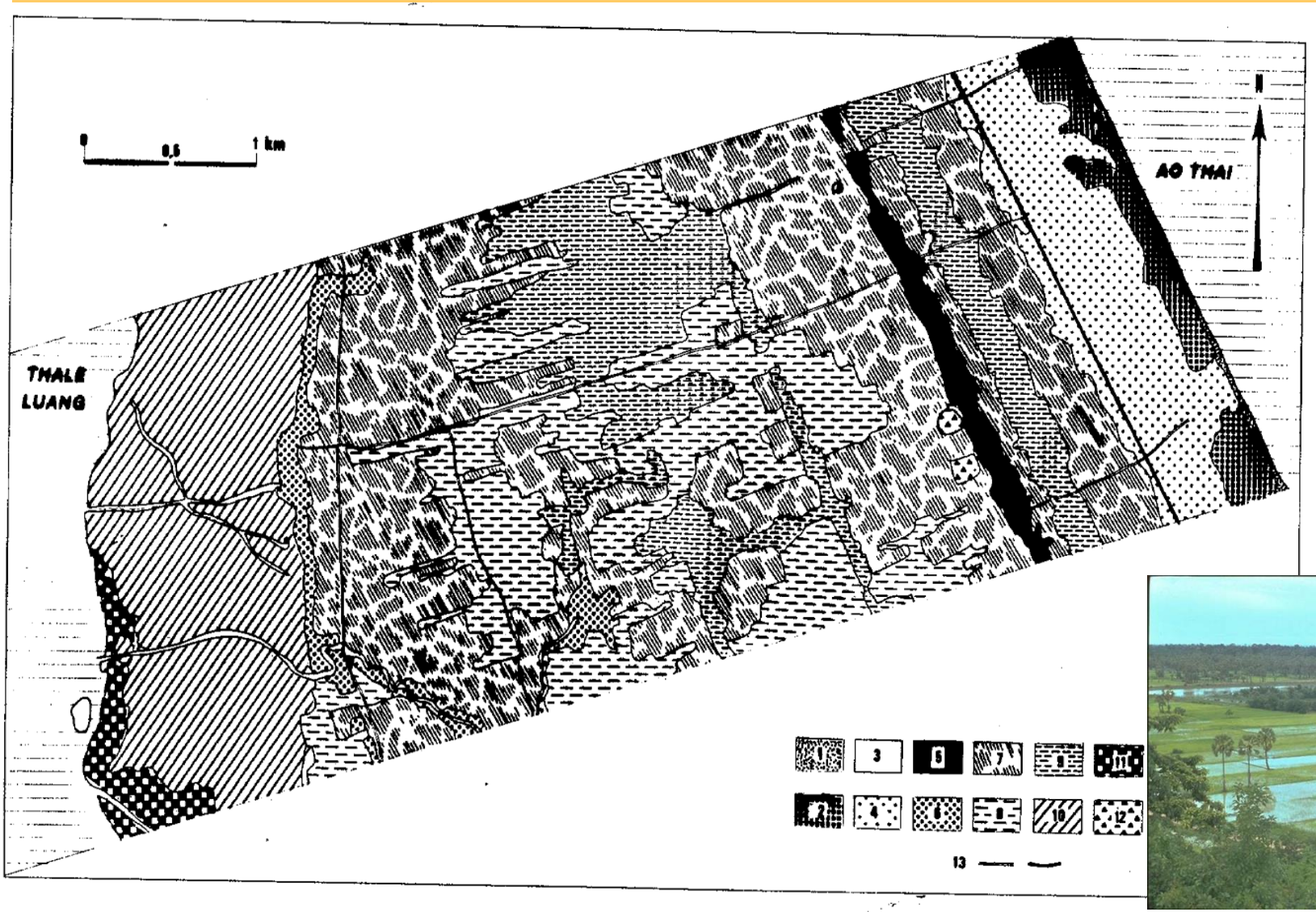
Transitional highland swiddening system

Chiang Rai province, Upper Northern Highlands

REGIONAL LEVEL (AGRARIAN SYSTEM)



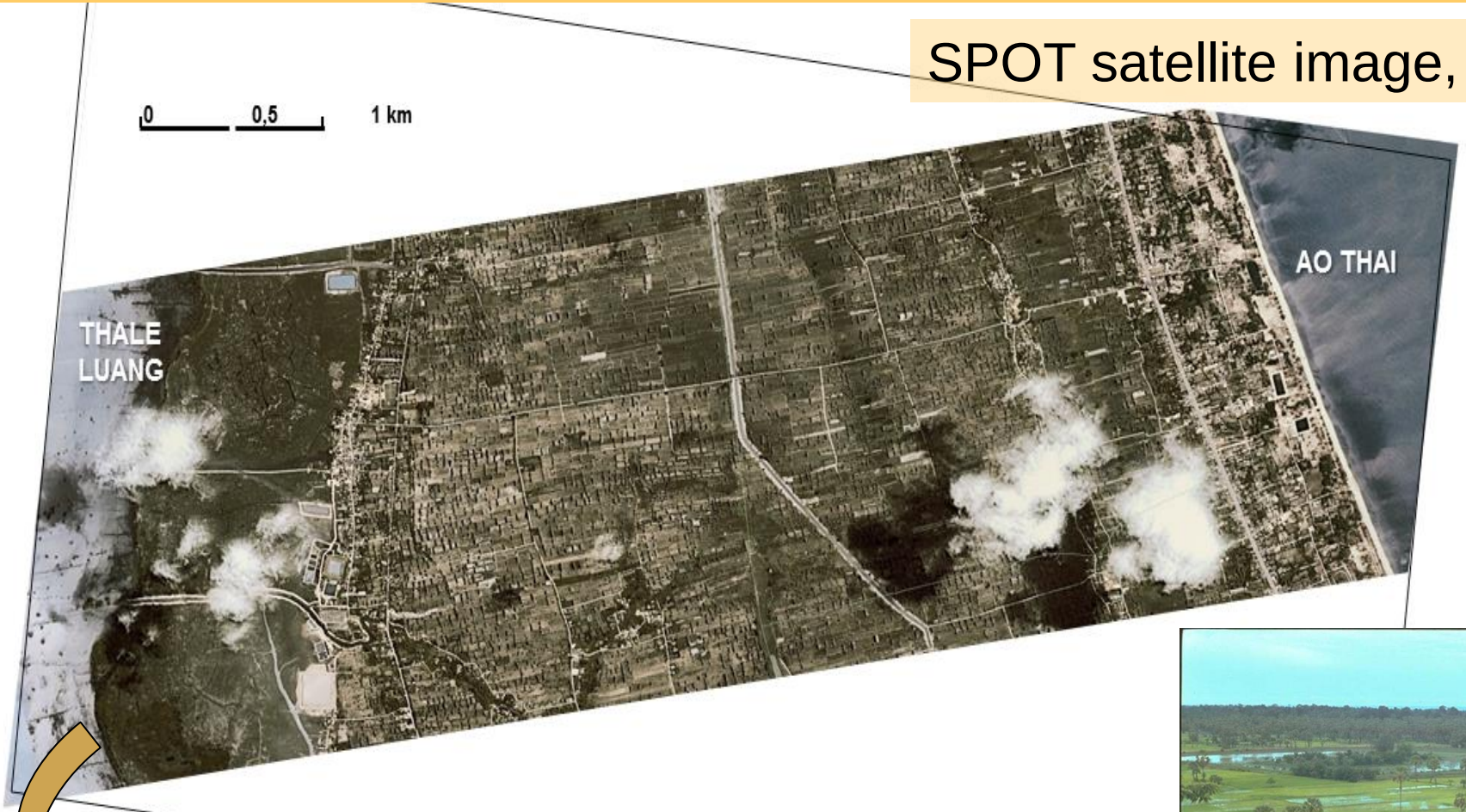
AGROECOLOGICAL ZONATION ALONG A W-E TRANSECT SATHING PHRA AREA, SONGKHLA PROVINCE, SOUTHERN THAILAND - 1986



Based on aerial photos

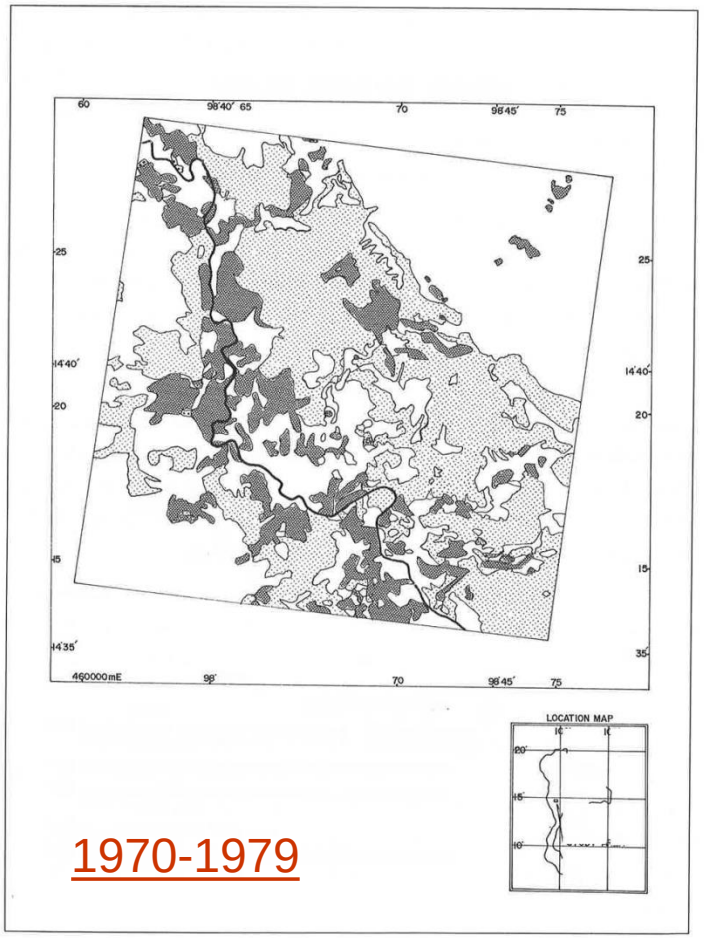
AGROECOLOGICAL ZONATION ALONG A W-E TRANSECT SATHING PHRA AREA, SONGKHLA PROVINCE, SOUTHERN THAILAND – UPDATING LAND USE

SPOT satellite image, June 2011



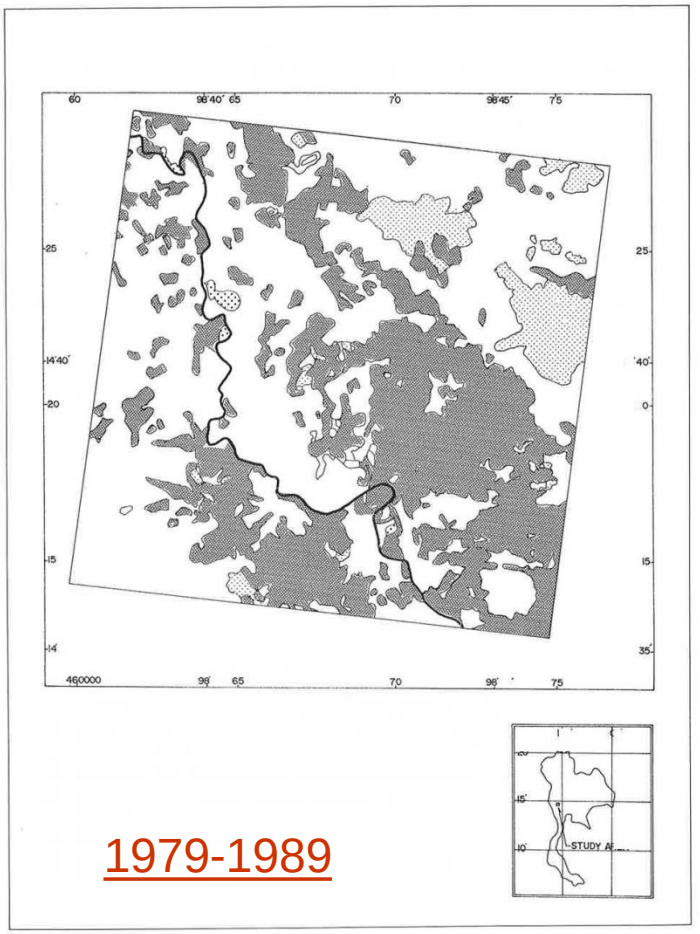
Use of such document in participatory mapping with local stakeholders

AGROECOLOGICAL ZONATION & LUCC: upper Maeklong valley, Kanjanaburi province, Western Thailand



1970-1979

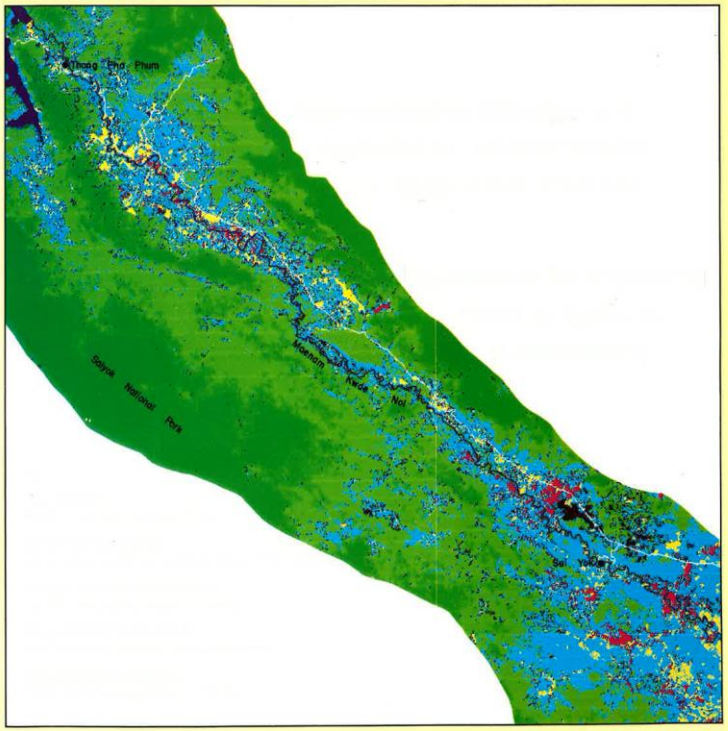
Phase of conversion of mixed deciduous Forest Into upland crop growing areas / Pioneer front

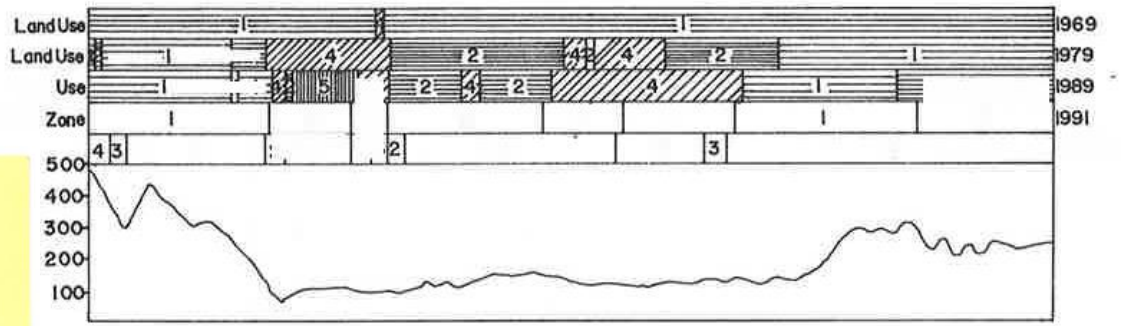


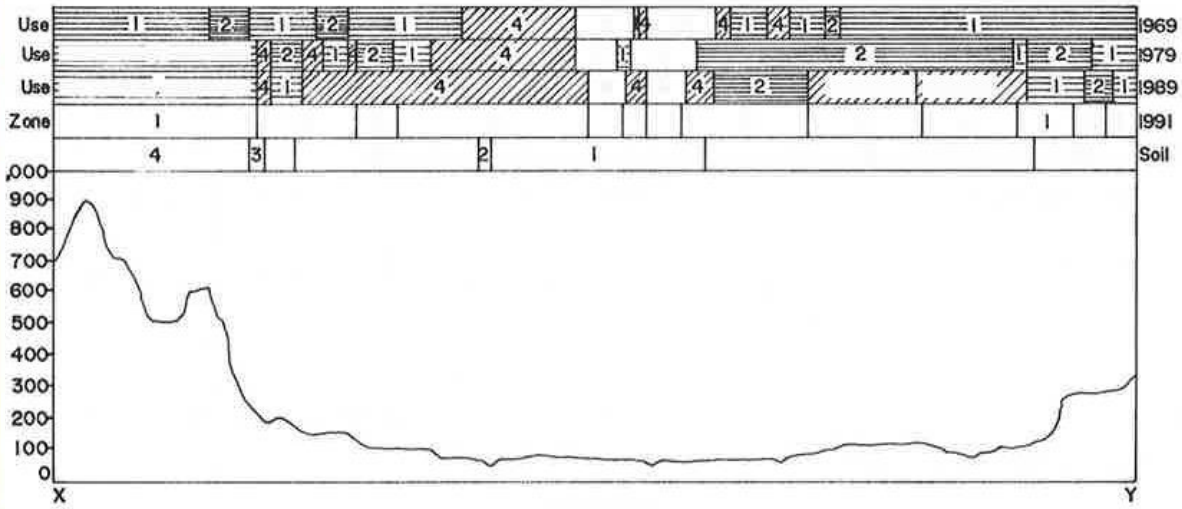
1979-1989

Phase of expansion of industrial cash Crops (maize, sugarcane, cassava) & Introduction of perennial plantations

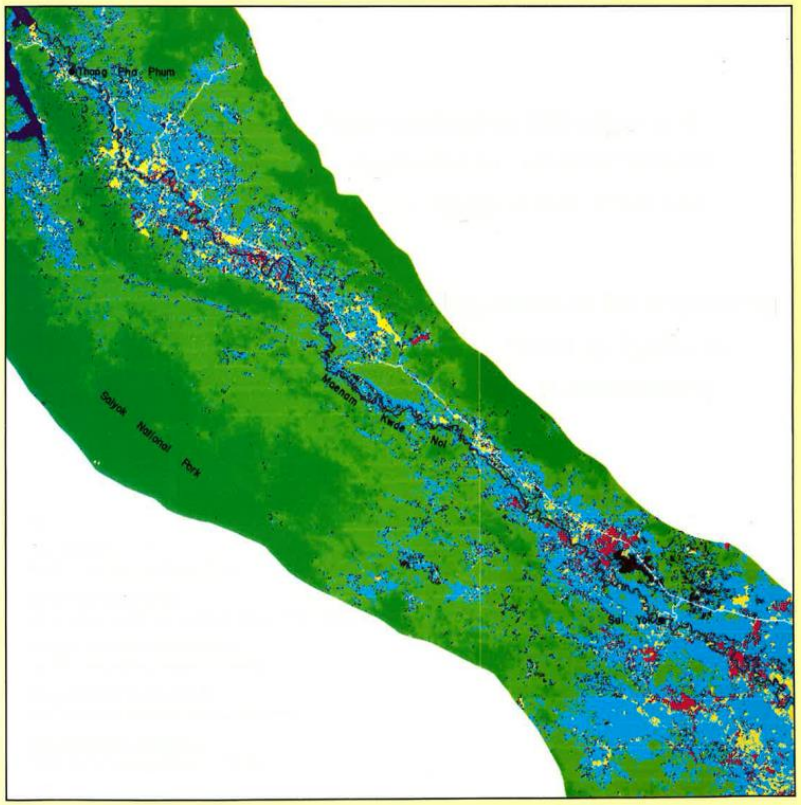
AGROECOLOGICAL ZONATION & LAND USE CHANGE: Upper Maeklong valley, Kanjanaburi province, Western Thailand



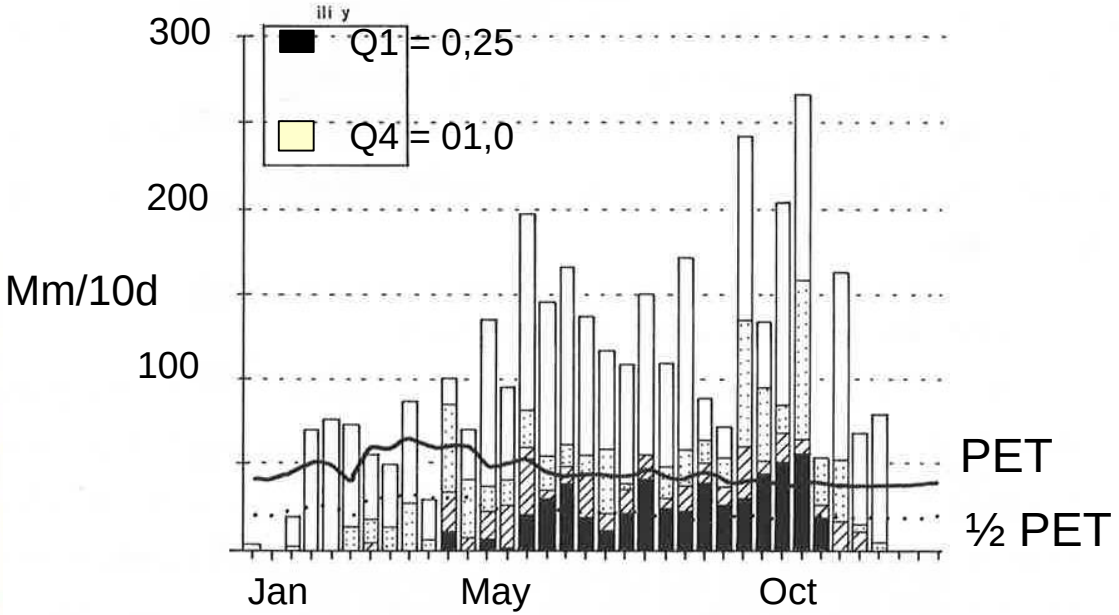




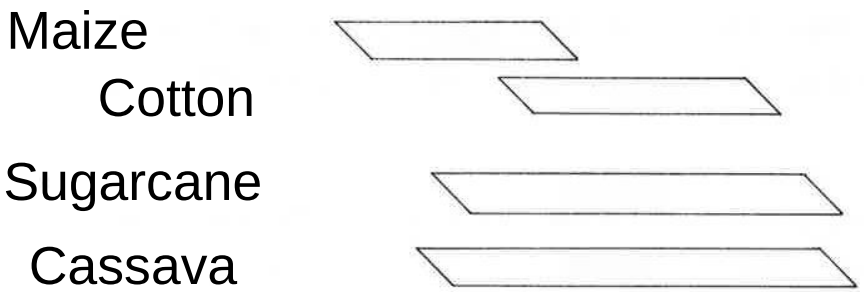
TIME & VARIABILITY:
CROP YEAR ZONATION
Upper Maeklong valley, Kanjanaburi province, Western Thailand



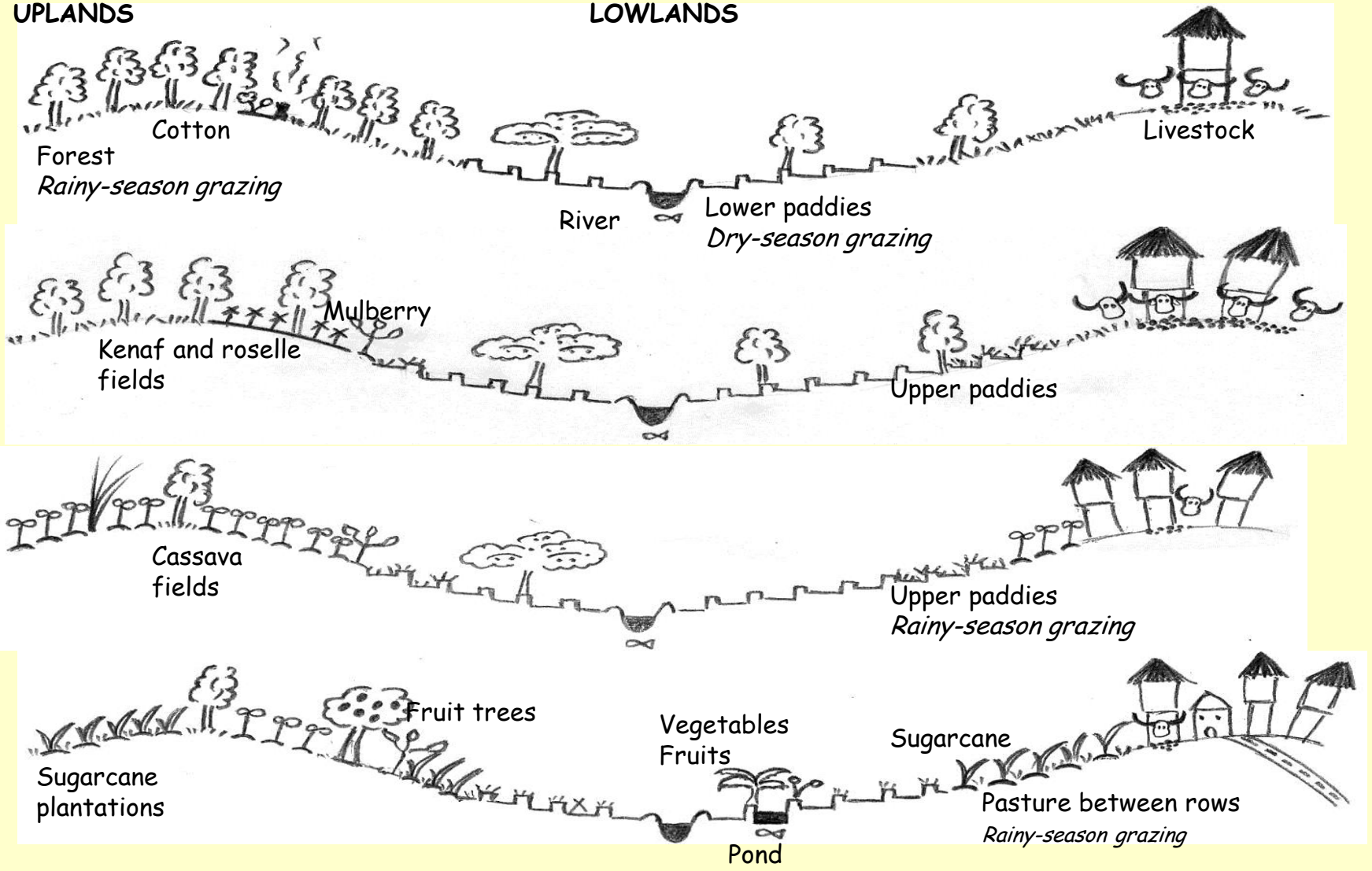
Frequential Climatic Analysis



Cropping Calendar



AGROECOLOGICAL ZONATION & AGRICULTURAL TRANSFORMATIONS
Ban Hin Lad village, Khon Kaen Province, Upper Northeast Thailand



ANALYSIS OF RECENT TRANSFORMATIONS OF REGIONAL AGRICULTURE

- **To distinguish & characterize the main changes of agricultural production processes in the past decades**

- **To identify causes of differentiation among farmers & their agricultural production systems**

STUDY OF REGIONAL AGRICULTURAL TRANSFORMATIONS: DATA ANALYSIS

1- Descriptive inventory of main changes

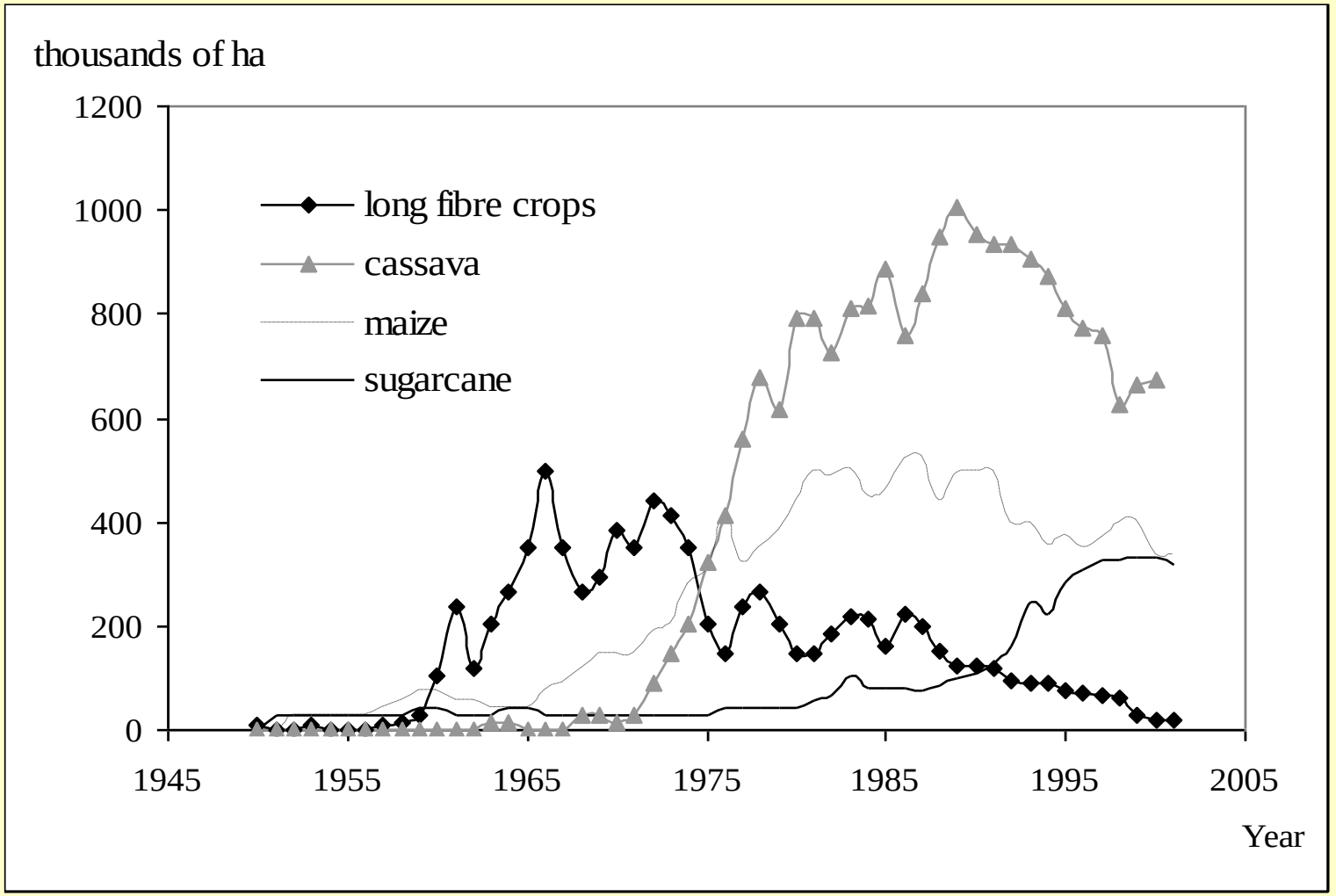
2- Analysis of relationships & determining factors of change:

- ❸ Nature
- ❸ Origin
- ❸ Cause
- ❸ Extent
- ❸ Consequences

STUDY OF REGIONAL AGRICULTURAL TRANSFORMATIONS: DATA ORGANISATION

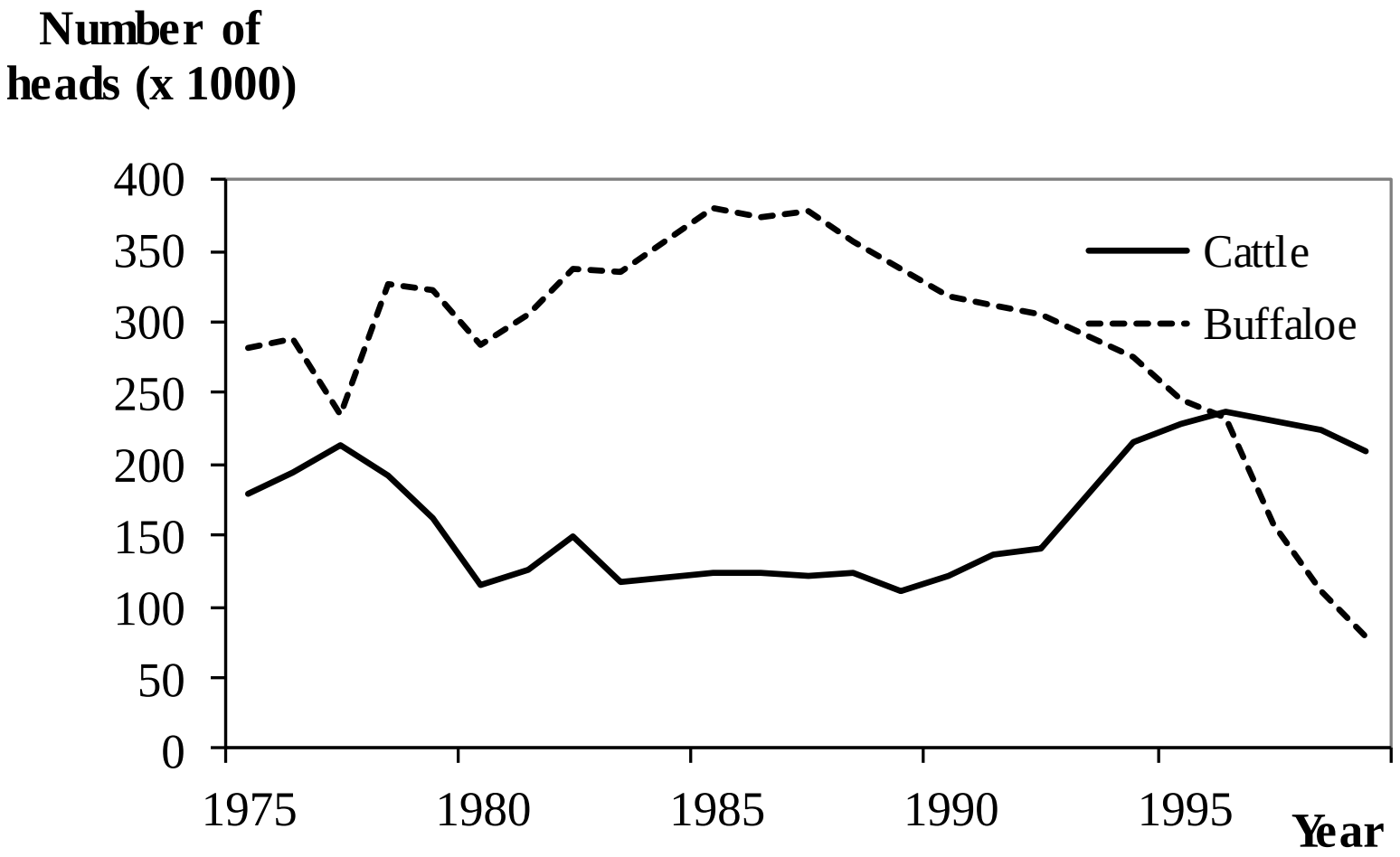
: Demographic pressure
: Marketing conditions
: Farm supplies (inputs, equipment)
: Rural credit patterns
: Land tenure patterns
: Labor market
: State intervention
: Farmer income, productivity

AGRICULTURAL TRANSFORMATIONS: Change in non rice land use in Ban Hin Lad, Khon Kaen Province, Upper NE Thailand

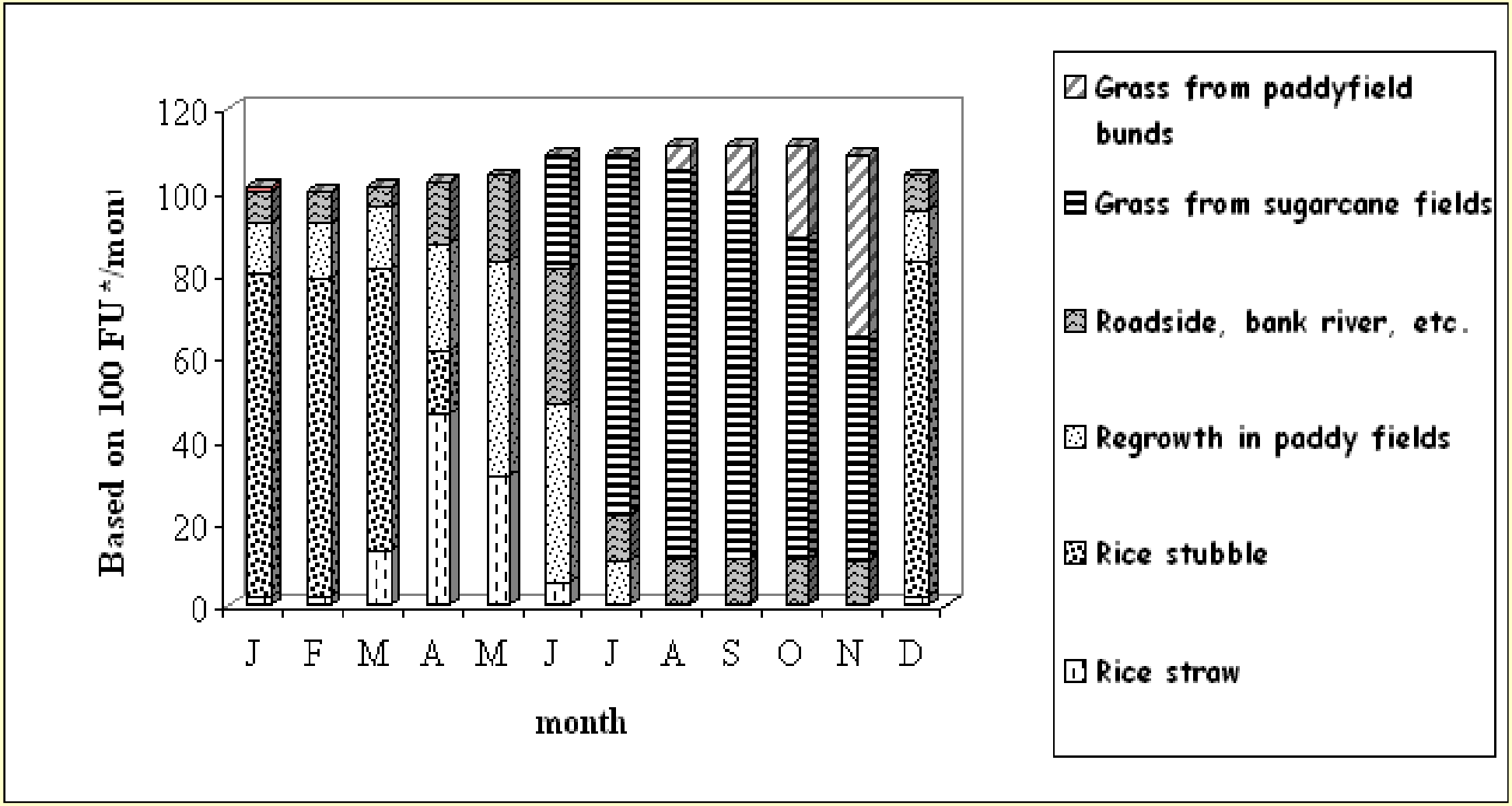


Typical succession of industrial crops over second half of XXth century

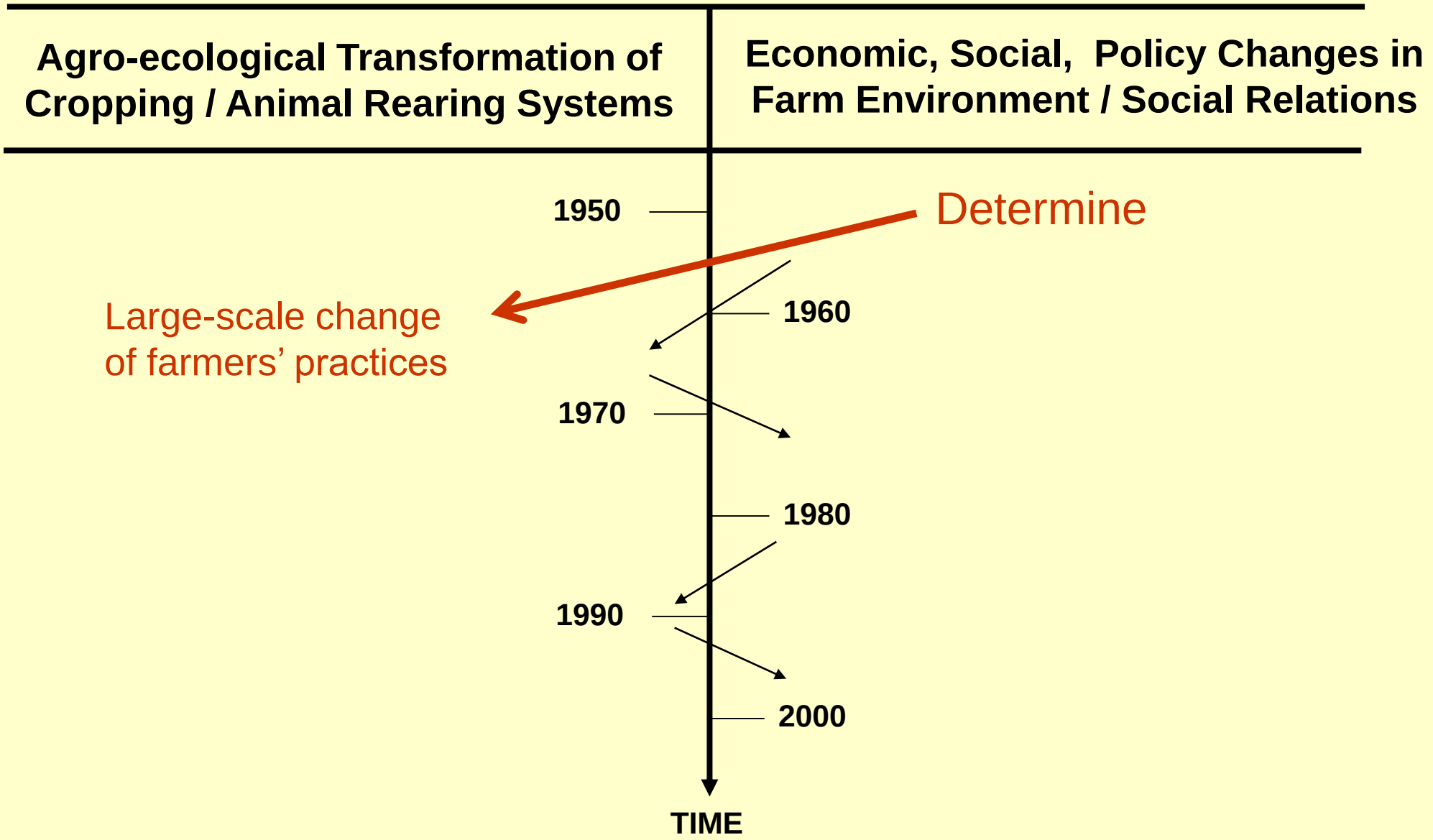
AGRICULTURAL TRANSFORMATIONS: Change in livestock rearing systems due to moto-mechanization in Ban Hin Lad, Khon Kaen Province, NE Thailand



AGROECOLOGICAL ZONATION & CROP-ANIMAL INTERACTIONS: FEEDING LIVESTOCK IN BAN HIN LAD, KHON KAEN PROVINCE



THE HISTORICAL PROFILE: PRINCIPLES & HOW TO READ IT



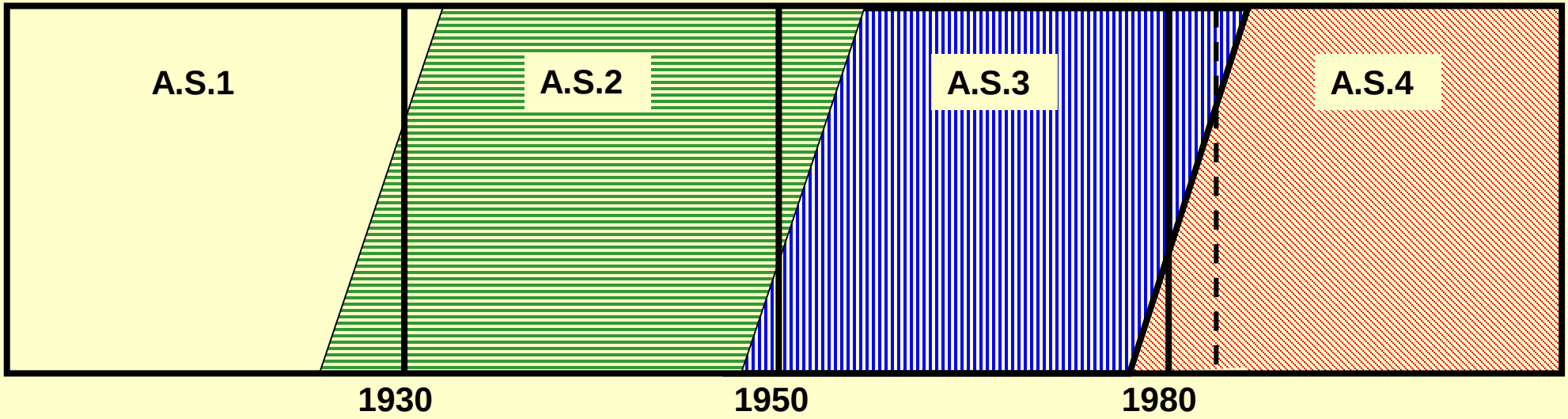
THE SEQUENCE OF AGRICULTURAL SYSTEMS :
Ex. OF KAMPHAENGSAEN DISTRICT, NAKHON, PATHOM PROVINCE, CENTRAL DELTA THAILAND

A.S.1 Before 1930

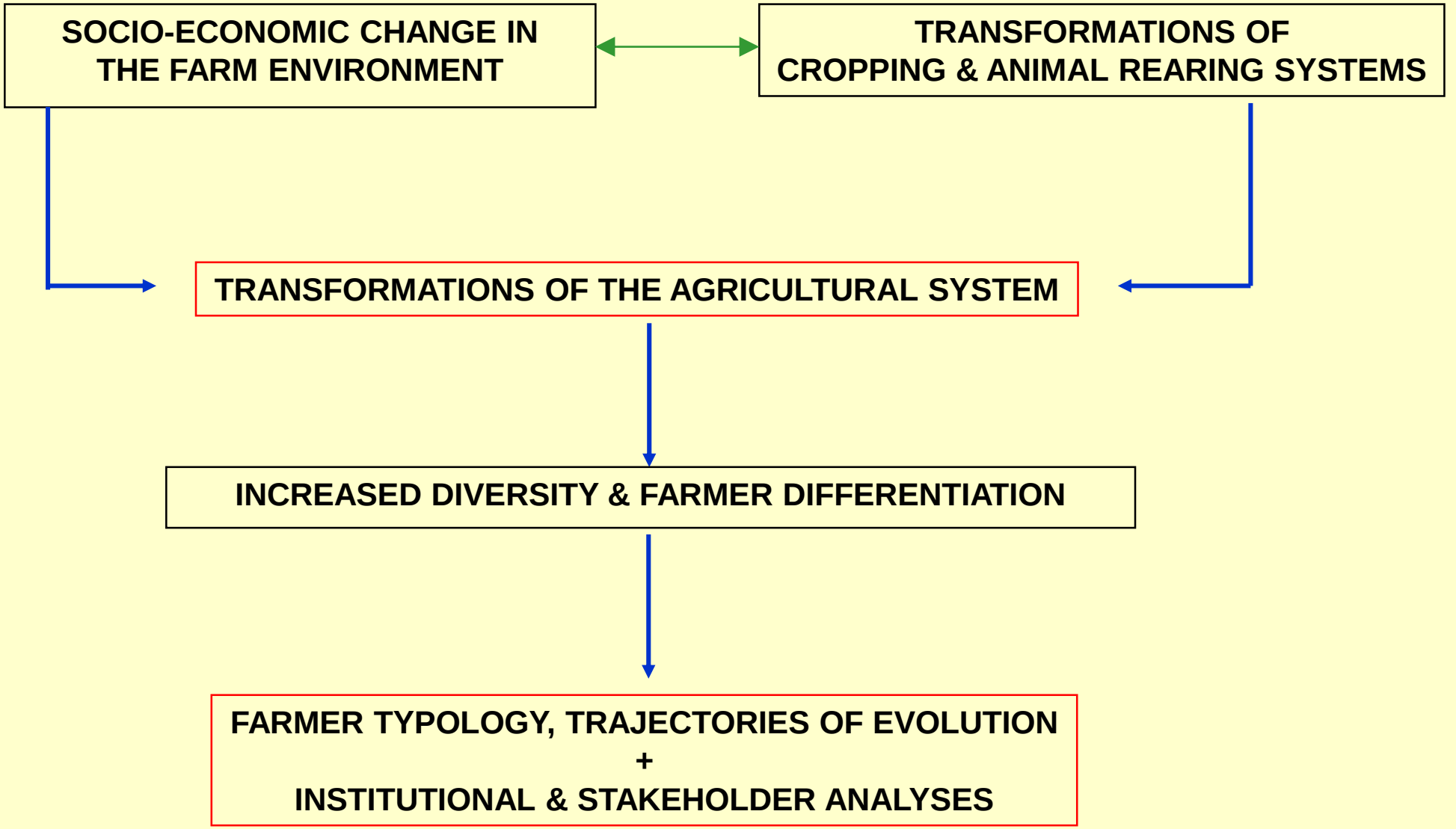
A.S.2 1930-1950 ← - - - - - - - - **Roads**

A.S.3 1950-1980 ← - - - - - - - - **Sugarmills / cane prices**

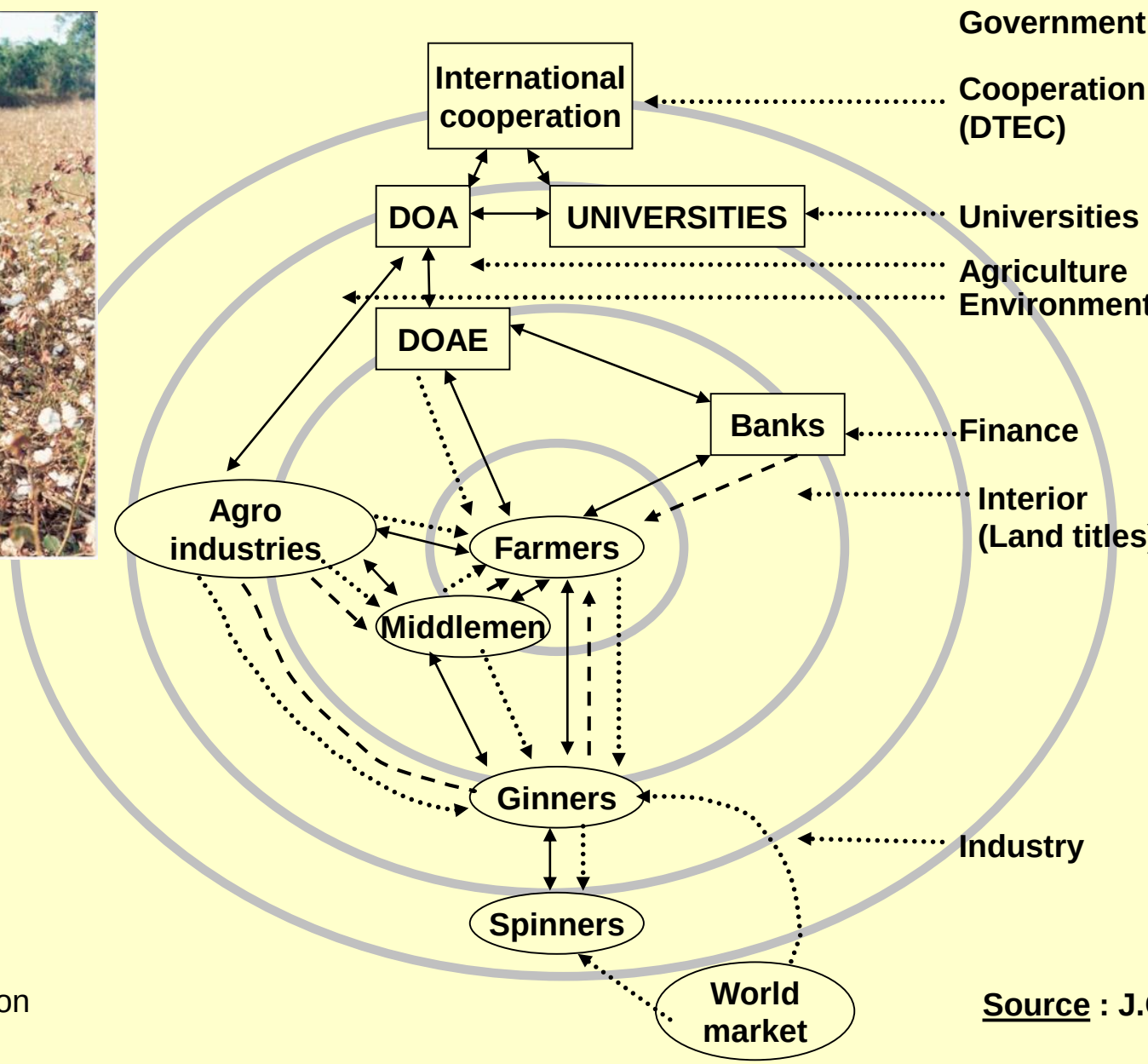
A.S.4 1980-..... ← - - - - - - - - **Irrigation + Market integration**



ORIGIN & IMPORTANCE OF FARM DIVERSITY

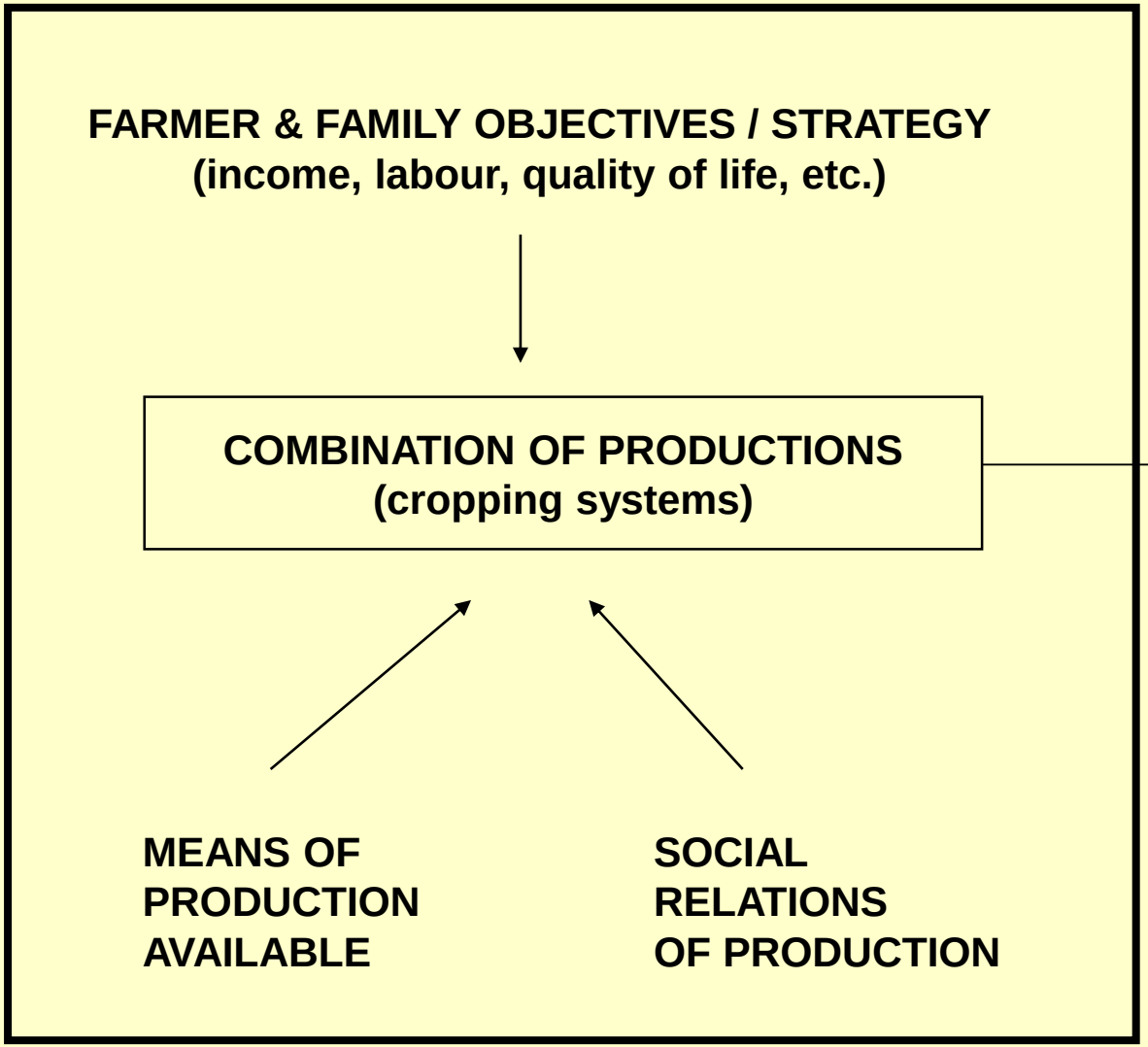


INSTITUTIONAL FRAMEWORK OF A COTTON-BASED AGRICULTURAL SYSTEM RESEARCH PROJECT IN KANJANABURI PROVINCE, WESTERN THAILAND



Source : J.C. Castella, 1995

FARMING HOUSEHOLD LEVEL (AGRICULTURAL PRODUCTION SYSTEM)



Analysis of functioning of diverse types of A.P.S. :

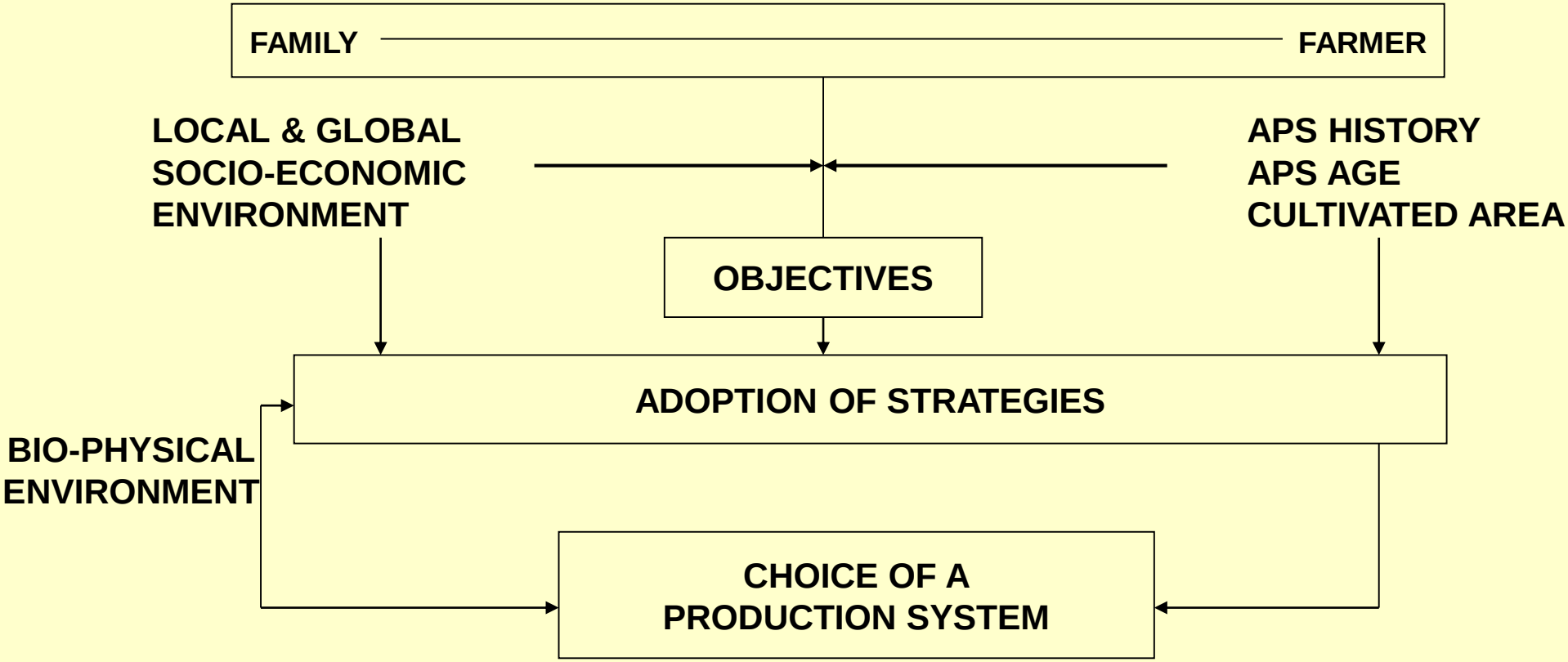
- **Main orientation**
- **Strategy (re. income, labour, risk, etc.)**
- **Key decision-making processes**

THE AGRICULTURAL PRODUCTION SYSTEM: A DEFINITION

APS: “the **whole structured set** of plants, domestic animals and other productions or activities **selected by a farmer** and his family for his production unit **to achieve his objectives**”

(M. Sebillotte; Capillon & Manichon)

FUNCTIONING OF THE AGRICULTURAL PRODUCTION SYSTEM



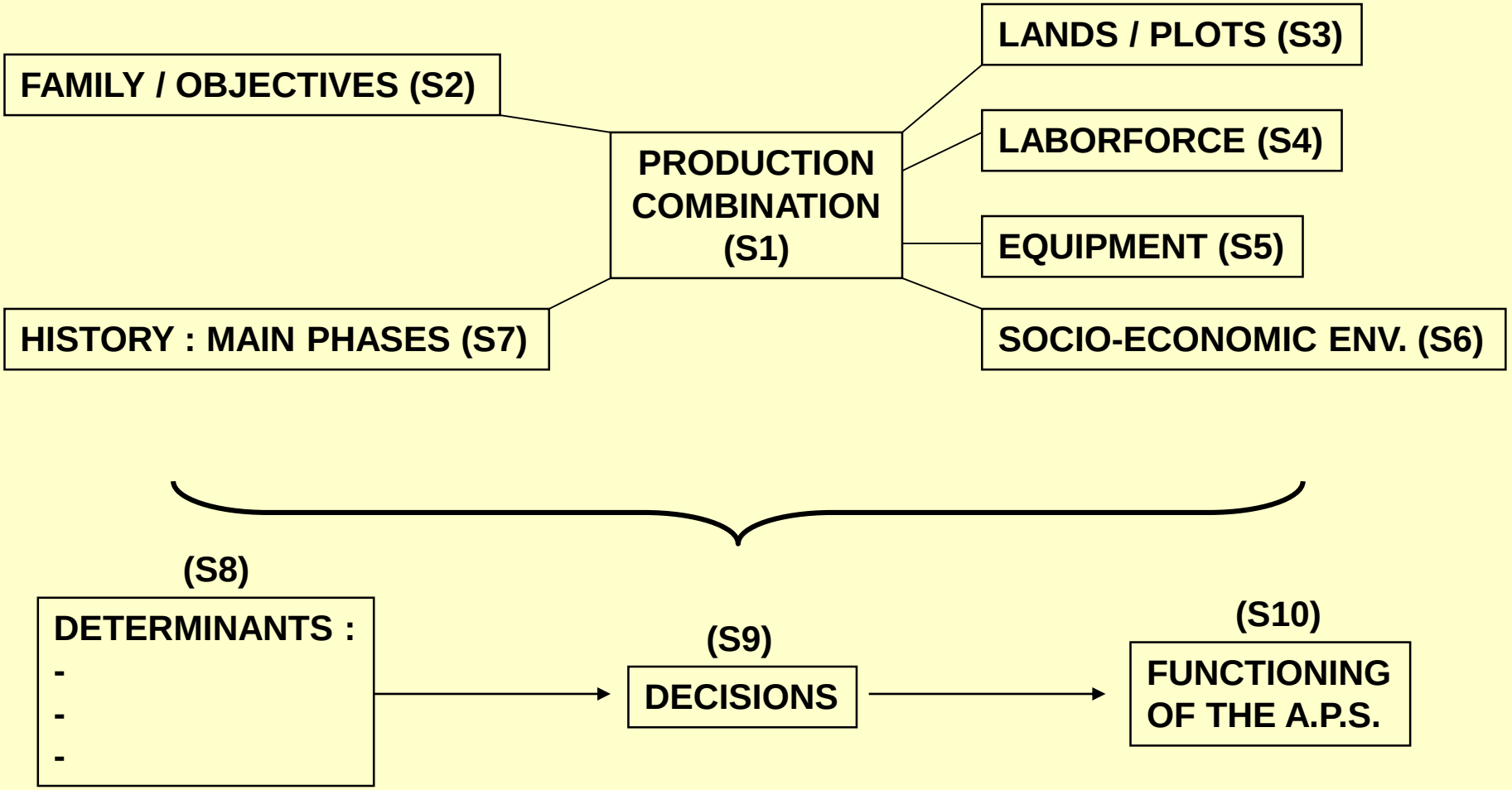
ANALYSIS OF THE APS FUNCTIONING

INCOME CASH MANAGEMENT	FARM LABOR LABOR CALENDAR	TECNICAL EFFICIENCY

* JUDGMENT ACCORDING TO FARMER'S OBJECTIVES AND STRATEGIES
* ABILITY OF THE APS TO CONTINUE

Source: M. Sebillotte, 1988

STAGES OF THE GUIDELINES FOR APS ANALYSIS



PRESENTATION OF THE APS STRATEGY

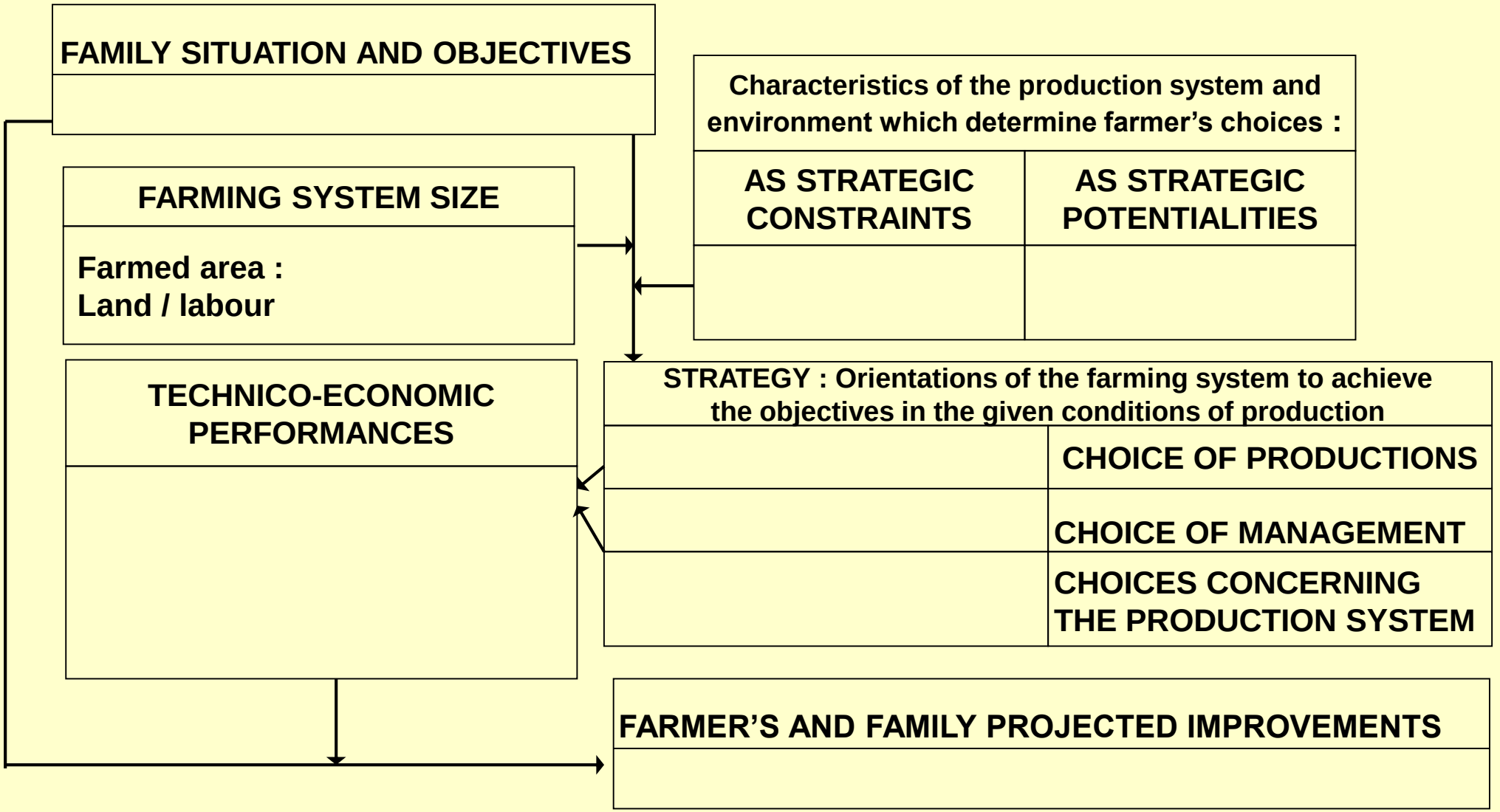
FAMILY SITUATION & ITS OBJECTIVES

↓

STRATEGY : main orientation of the APS to achieve its objectives in the given conditions of production

	CHOICE OF PRODUCTION
	CHOICE OF MANAGEMENT
	TECHNICAL CHOICES CONCERNING THE PRODUCTION SYSTEM

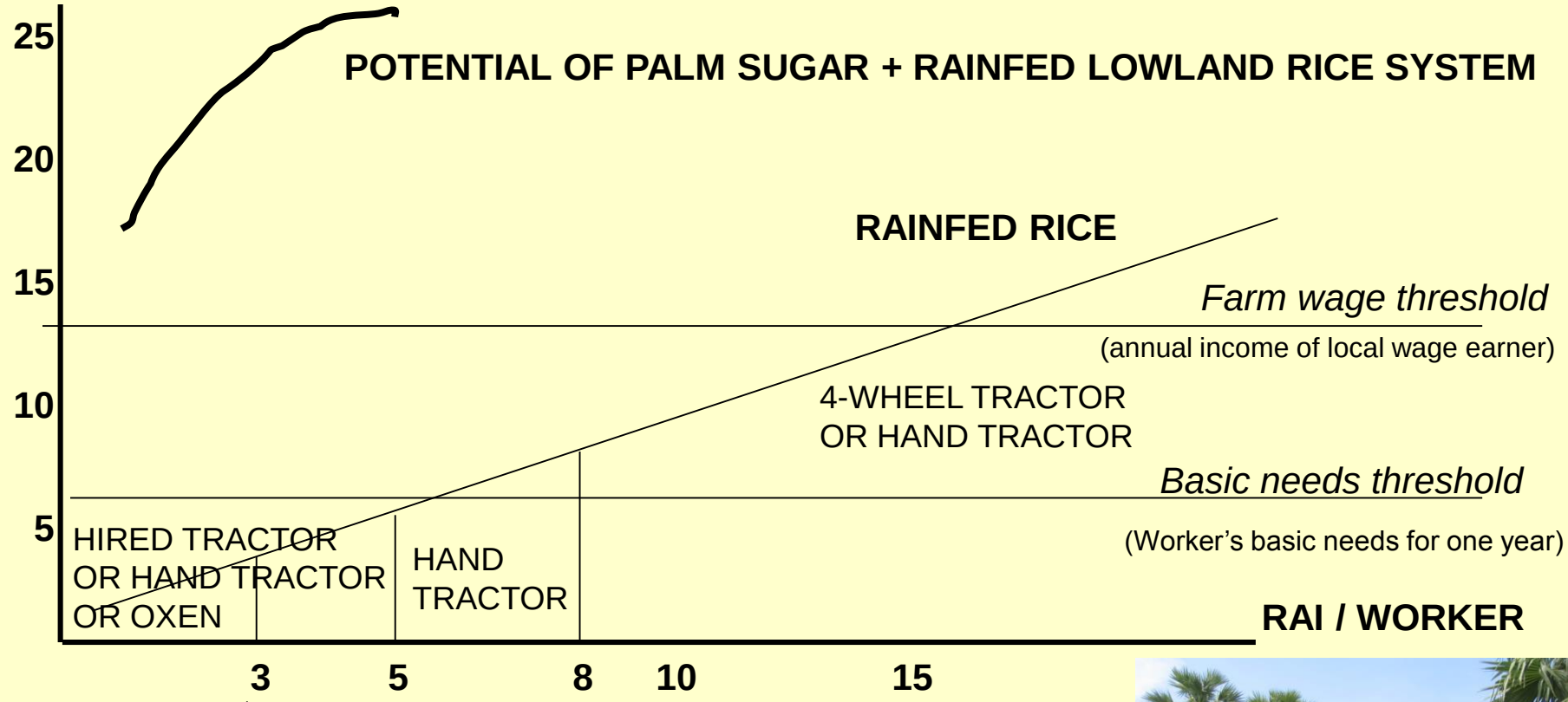
DIAGRAMMATIC PRESENTATION OF THE APS FUNCTIONING



Micro-economic assessment:
Gross Product / Intermediate Consumptions / Depreciation Fixed Capital / Net Value Added / Family Income

DYNAMICS OF LABOUR PRODUCTIVITY, SATHING PHRA AREA
SONGKHLA PROVINCE, SOUTHERN THAILAND - 1988

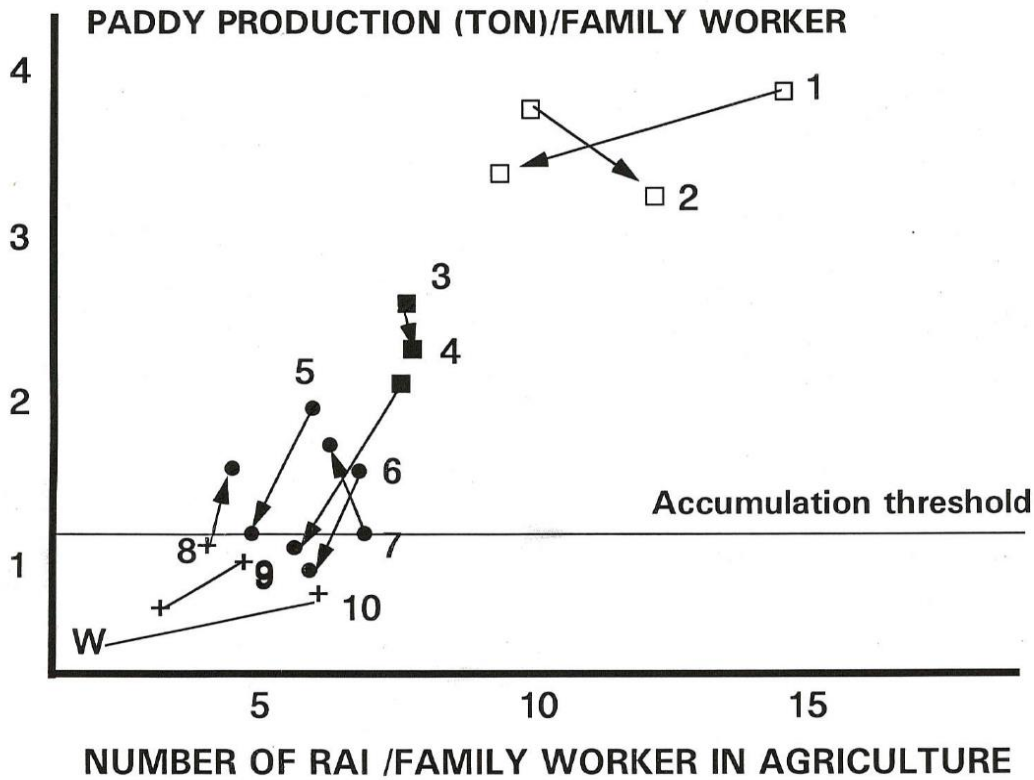
LABOUR PRODUCTIVITY (X 1000 BATH/WORKER)



FARM TYPE	A	B	C	D
FREQUENCY	60%	20%	15%	5%

LABOUR PRODUCTIVITY DYNAMICS IN RAINFED LOWLAND RICE, SATHING PHRA, SONGKHLA PROVINCE, SOUTH THAILAND

1982-83 / 1987-88 CROP YEARS

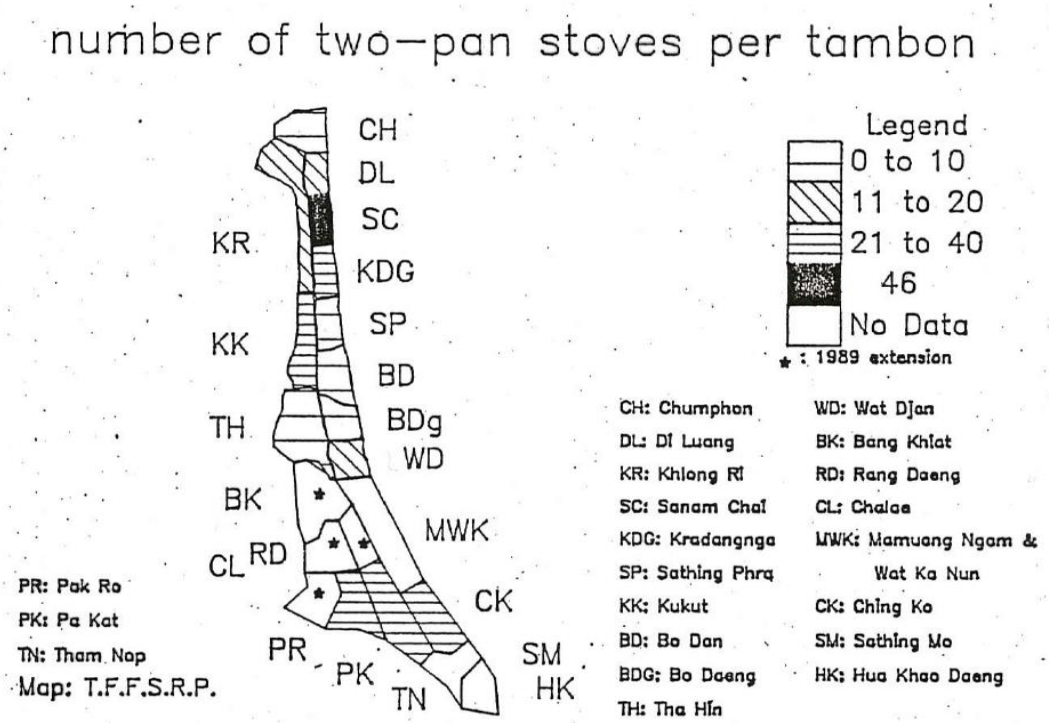


Legend : Types of APS : + = A● = B ■ = C □ = D

W = wage earner

Evolution of labor productivity according to farmers' productive resources among 10 APS in Sathing Phra area between 1982-83 and 1987-88 crop years.

RAPID ADOPTION OF IMPROVED TECHNOLOGY FOR PALM SUGAR PRODUCTION IN, SATHING PHRA DISTRICT, SONGKHLA PROVINCE, SOUTH THAILAND

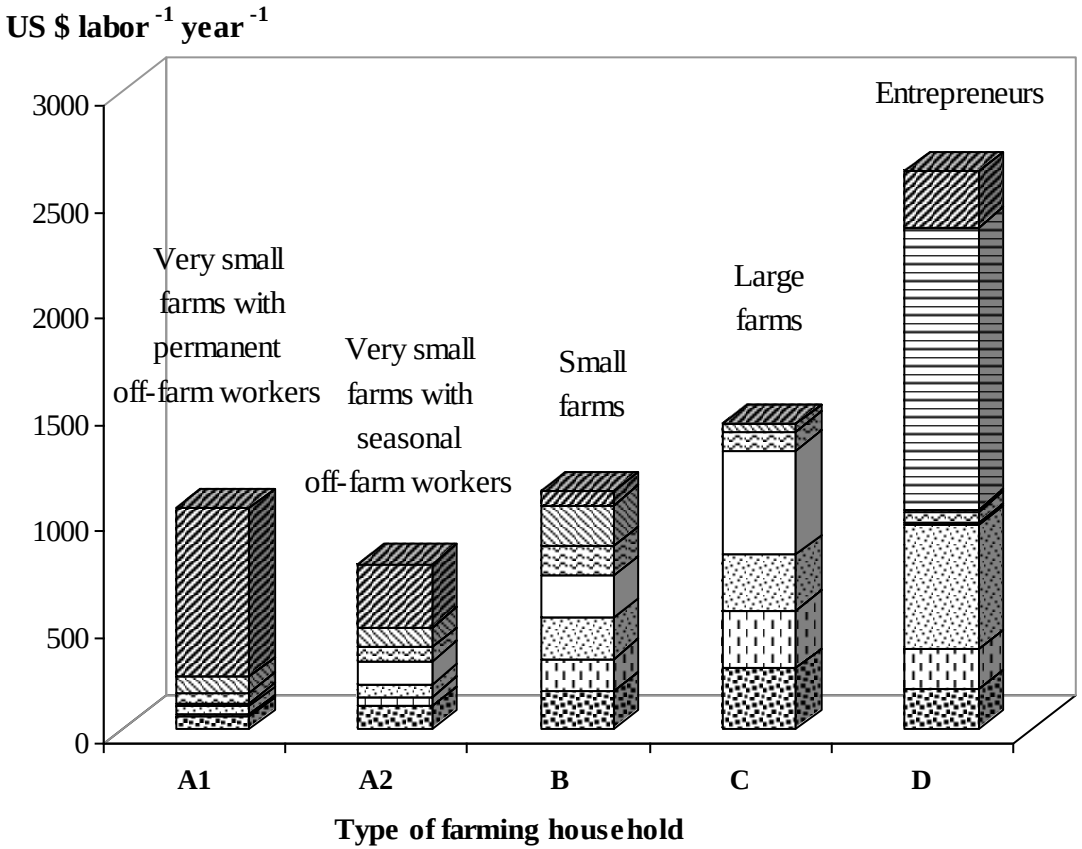


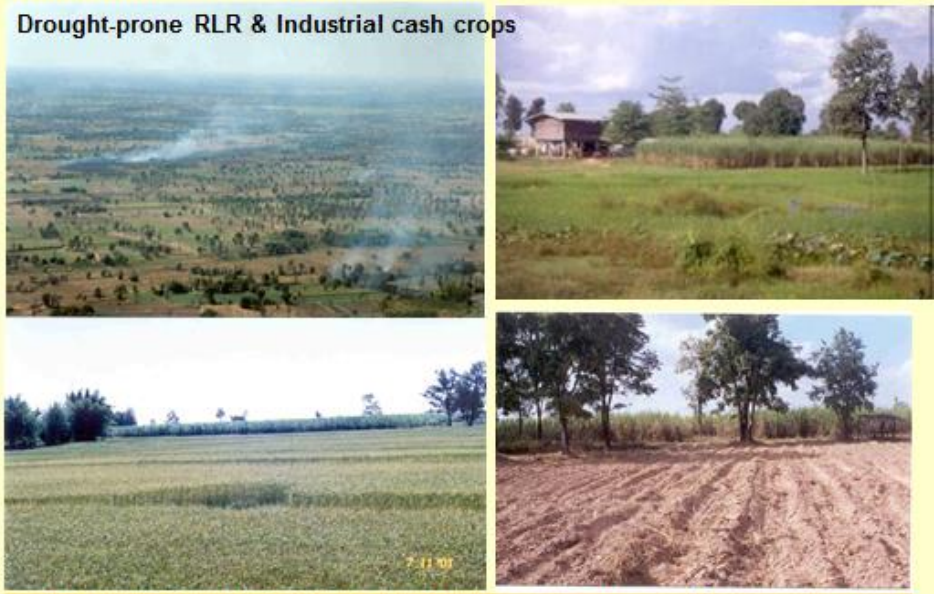
Number of improved pan stoves per sub-district in 1988

FARM DIVERSITY & FARMER DIFFERENTIATION:
MAIN FARM TYPES, Ban Hin Lad, Khon Kaen Province, Upper NE

Composition of family income / type of farm

NET TOTAL HOUSEHOLD INCOMES & SOCIAL EQUITY AMONG APS TYPES IN BAN HIN LAD, KHON KAEN PROVINCE, UPPER NORTHEAST THAILAND, 2001





◇ A1: Farms of permanent outside workers

◆ A2: Farms of seasonal outside workers

△ B: Small family farms

■ C: Family farms with wage-earners

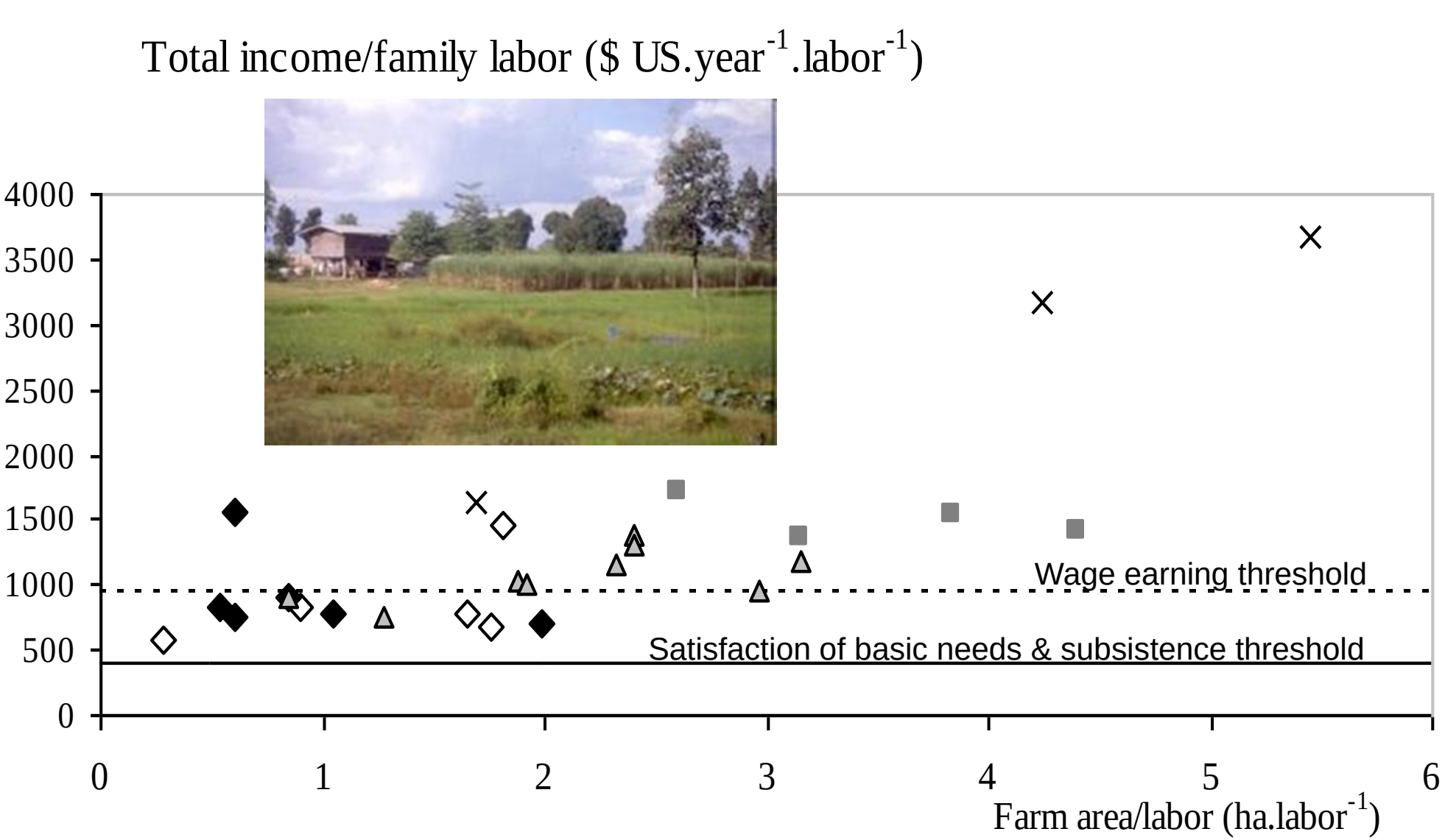
× D: Contractors

——— Accumulation threshold

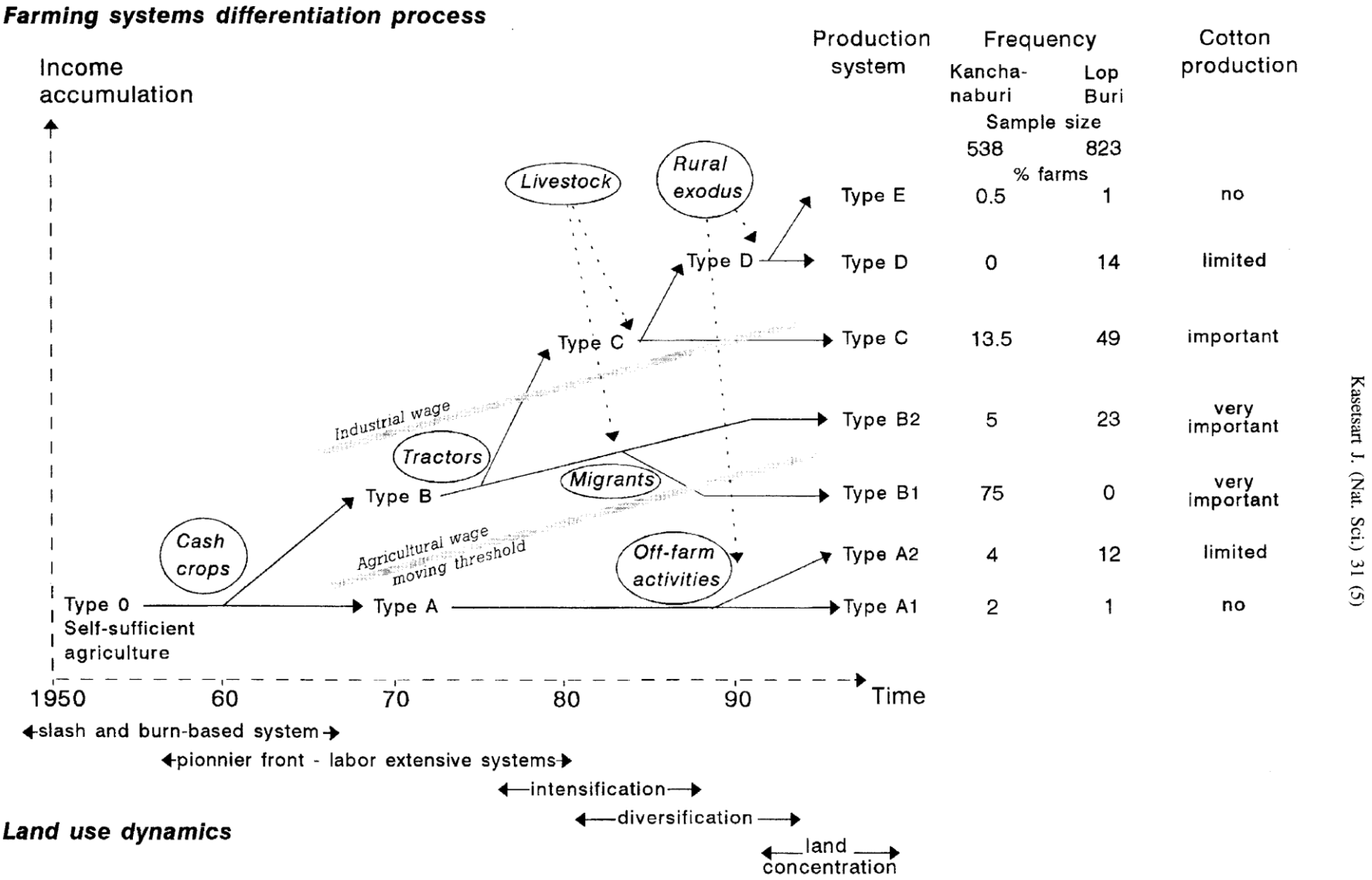
- - - - - - Off-farm opportunities threshold

LABOUR PRODUCTIVITY & SUSTAINABILITY OF APS TYPES IN BAN HIN LAD VILLAGE, KHON KAEN, UPPER NORTHEAST

LABOUR PRODUCTIVITY & SUSTAINABILITY OF APS TYPES
IN BAN HIN LAD, KHON KAEN PROVINCE, UPPER NORTHEAST THAILAND



DIFFERENTIATION AMONG LOCAL HOUSEHOLD SYSTEMS: Upper Maeklong valley, Kanjanaburi province, Western Thailand



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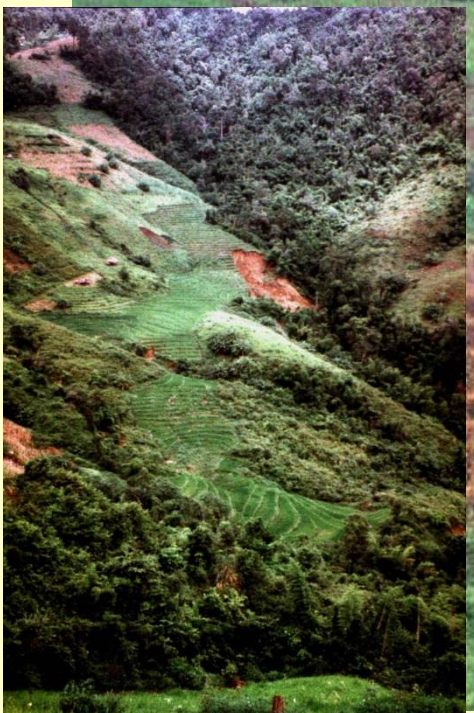
TRAJECTORIES OF APS IN Mae Salaep Akha village, MAE FAH LUANG DISTRICT, CHIANG RAI, UPPER NORTHERN HIGHLANDS

Market integration Phase 1: Low value low input annual cash crops



TRAJECTORIES OF APS IN Mae Salaep Akha village, MAE FAH LUANG DISTRICT, CHIANG RAI, UPPER NORTHERN HIGHLANDS

Market integration Phase 2: High value high input high (risk) perenial cash crops

Lychee (3-70 Bahts/kg) →

For secured investors (type C)

Green tea (6-12 Bahts/kg) →

« Poor man perennial crop »

TYPOLOGY OF MAIN APS CATEGORIES in Mae Salaep, MAE FAH LUANG DISTRICT, CHIANG RAI, UPPER NORTHERN HIGHLANDS

- A: small farms, often newcomers

or young families, mainly on steep land,

main orientation: annual cash crops

- B: medium-sized farms,

conservative behaviour,

mainly subsistence crops & low input cash crops

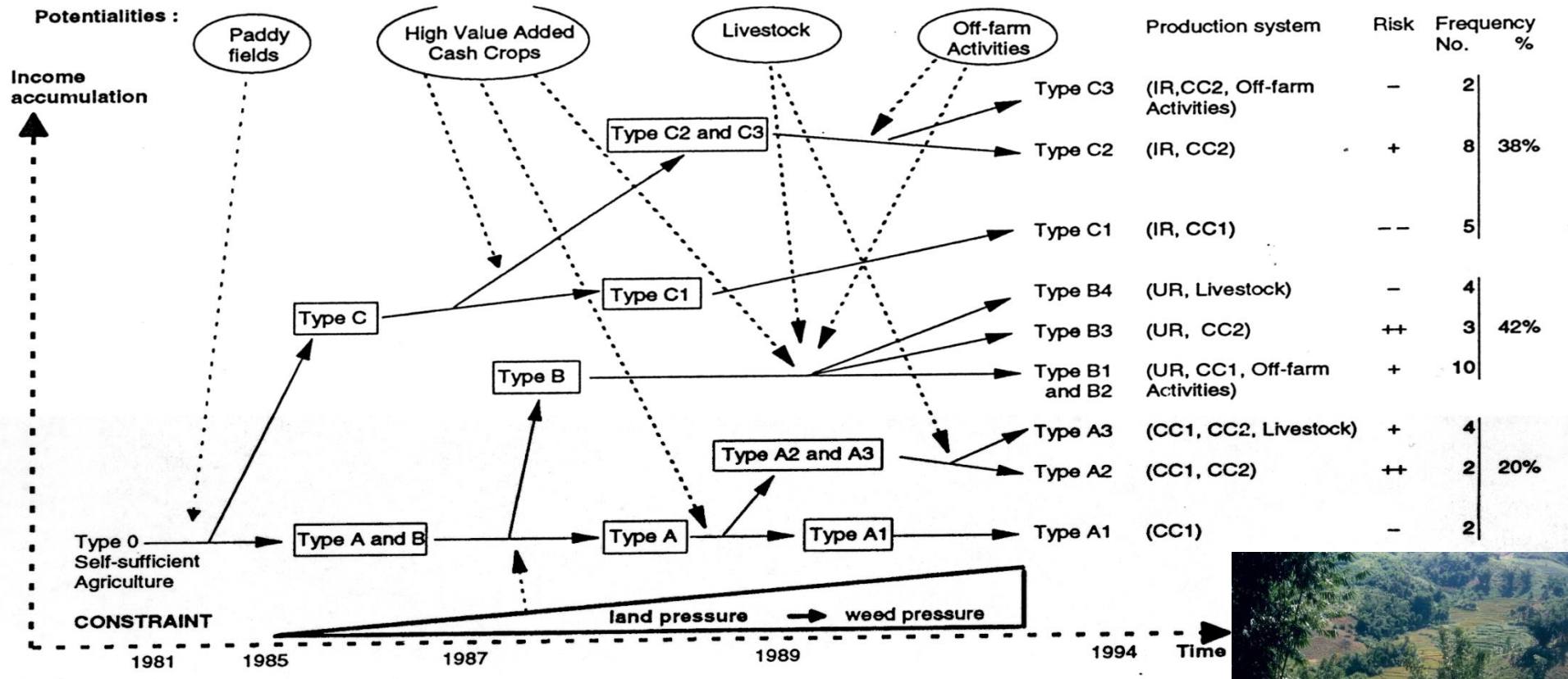
- C: largest holdings, often early settlers

with access to best land (terraced paddies),

market oriented, diverse combinations of

on & off-farm productions & activities

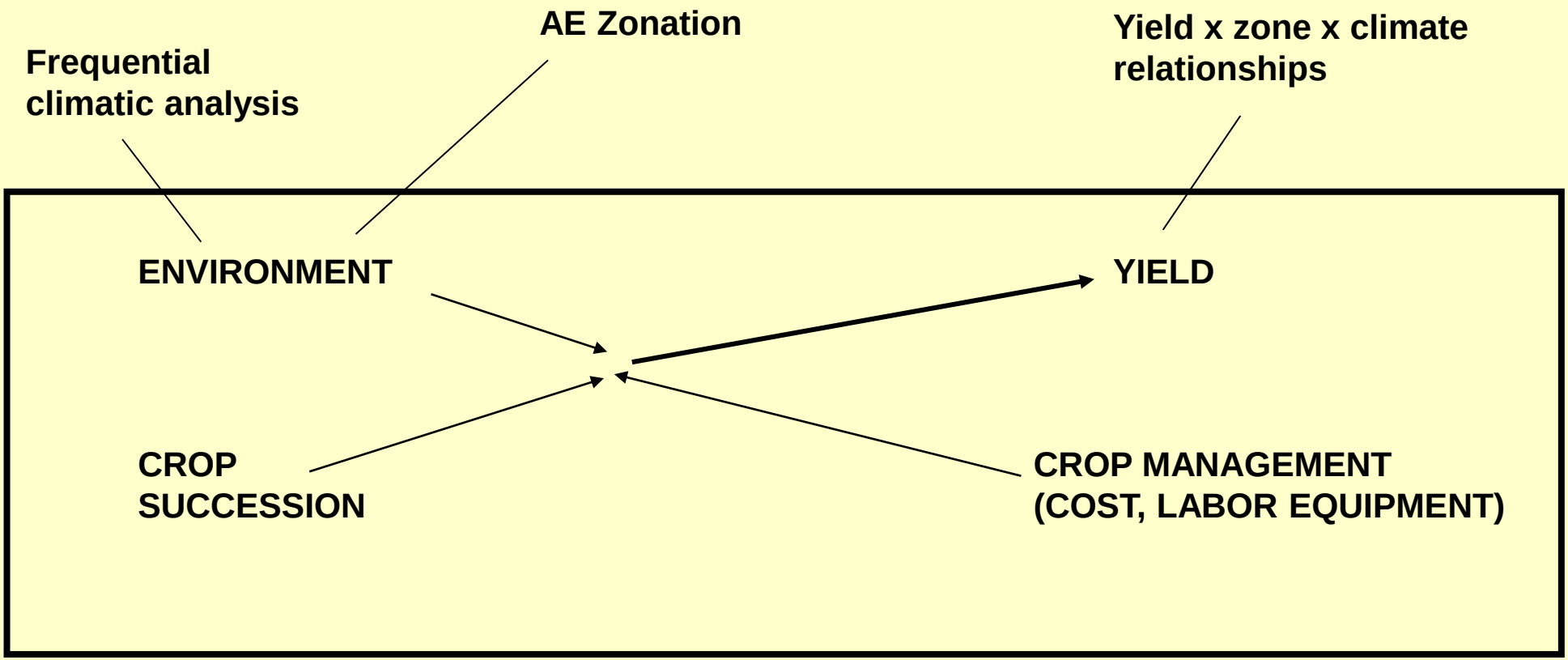
TRAJECTORIES OF APS IN Mae Salaep Akha village, MAE FAH LUANG DISTRICT, CHIANG RAI, UPPER NORTHERN HIGHLANDS



IR : Irrigated Rice
UR : Upland Rice
CC1 : Low Value Added Cash Crops
CC2 : High Value Added Cash Crops

Figure 3. Trajectories of evolution for farming systems in Mae Salaep Lang, Chiang Rai Province, upper northern Thailand.

PLOT OR HERD LEVELS
(CROPPING OR ANIMAL REARING SYSTEMS)



PLOT LEVEL (CROPPING SYSTEM)

Limits of factorial trials to study of interactions

CONCEPT OF CROPPING SYSTEM : A DEFINITION

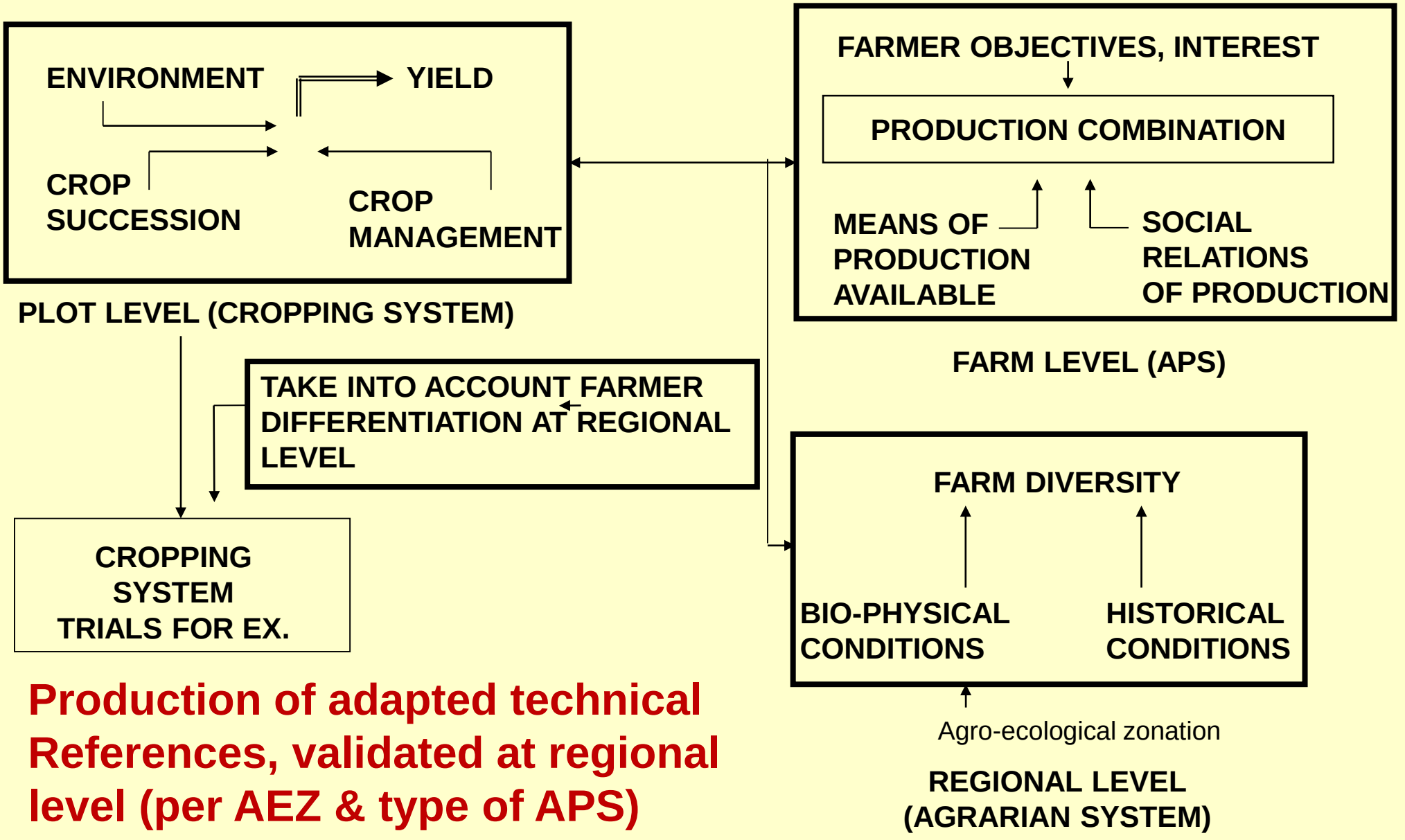
Cropping System (CS) : “the **succession of techniques** performed on a plot managed in an **identical way**. Each cropping system is defined by :

- the **crop species** and their **succession order**,

- the **crop management & techniques** applied to these several crop populations, including the varietal choice ”

Source: M. Sebillote, 1990

DIAGNOSTIC STUDIES PRIOR TO DESIGN CROPPING SYSTEMS ADAPTED TO THE DIVERSITY OF REGIONAL AGRICULTURE



Production of adapted technical References, validated at regional level (per AEZ & type of APS)

MAIN CHARACTERISTICS OF THIS APPROACH

- **TRANSDISCIPLINARY SYSTEM ANALYSIS : understanding of interactions > detailed knowledge of system components**

  Ecological & Technical <----> Social & Economic

- **Emphasis on HISTORICAL aspects at every scales :**

  - National & Regional agricultural transformations

  - APS evolution and phases

  - Plot management history

- **A COMPREHENSIVE & MULTI-SCALE/LEVEL approach to on-farm diversity with key tools to stratify complex realities :**

  - Zonation (inter-ecosystems, inter-farms & intra-plot heterogeneity)

  - Typologies (farmer categories, crop environment situations)

- **Proposed interventions GROUNDED in actual on-farm circumstances**

LIMITS OF THIS APPROACH IN CURRENT CONTEXT OF AGRICULTURAL & RURAL DEVELOPMENT

- **Focus on agricultural production processes / multifunctional character of agriculture → NEED TO BETTER TAKE ENVIRONMENTAL PROBLEMS INTO ACCOUNT**

- **Based on an expert approach & recommendations → NEED TO ARTICULATE WITH COMPLEMENTARY APPROACHES FACILITATING SHARING OF POINTS OF VIEW, CO-LEARNING, ACTUAL CHANGE, COLLECTIVE PLANNING & ACTION**

- **Improve the feedback of findings to farmers & decision-makers → TO EMPOWER THEM TO ACT & ENGAGE IN LOCAL ADAPTATION – TRANSFORMATION OF THEIR AGRARIAN SYSTEM**

FOR MORE INFO: SEVERAL REFERENCES (see on Research Gate)

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